TECHNOLOGY DEPT.

Gas Journal

VOL. 277. 106TH YEAR. LONDON, JANUARY 20, 1954. NO. 4729. PRICE 1/3

One of a series of advertisements dealing with fundamental features of the

SMITH UNIVERSAL DOMESTIC METER

The **PERFORMANCE IS CONSTANT** and the life of the meter long, due to the use of high quality materials, design and workmanship.

PUBLIC LIBRARY
DEPUTY

PRESSURE ABSORPTION
at a flow of 200 cu. ft. per hour on air is ONLY 0.3" W.G.

PERFORMANCE

VARIATION
in registration between 10 cu. ft. per hour and 300 cu. ft. per hour is considerably **LESS THAN 1%.**

The performance is **EQUAL TO THE D.2. TYPE OF METER**

The oscillation of pressure is **EXTREMELY LOW** at all rates.

Designed to meet the demands of all normal domestic loads, the Smith Universal Domestic Meter provides the maximum of reliability — requires the minimum of maintenance. It has been thoroughly tested and proved.

SMITH METERS *DOMESTIC AND INDUSTRIAL*

SMITH METERS LTD. 186 Kennington Park Rd., London, S.E.11. Phone: RELiance 2447-8-9. Grams: Smieters, Lamb, London
Works: Kennington, S.E.11 and Streatham Vale, S.W.16. Northern Sales office: 3-4 East Parade, Leeds, 1. Phone: 23726

LIONWELD

PRODUCTS for the GAS INDUSTRY

THE SUPERIOR STRENGTH OF LIONWELD IS IN THE JOINT WELDED ON BOTH SURFACES

WELDED
OPEN STEEL
FLOORING
STAIRTREADS
AND HANDRAIL
STANDARDS

May we send you our Illustrated Literature?

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MARSH ROAD, MIDDLESBROUGH
Telephone: 3657 ★ Telegrams: Lionweld

London Office: 12, STAPENHILL ROAD. NORTH WEMBLEY, MIDDX. Telephone: Arnold 5815

DONKIN
GAS COMPRESSORS

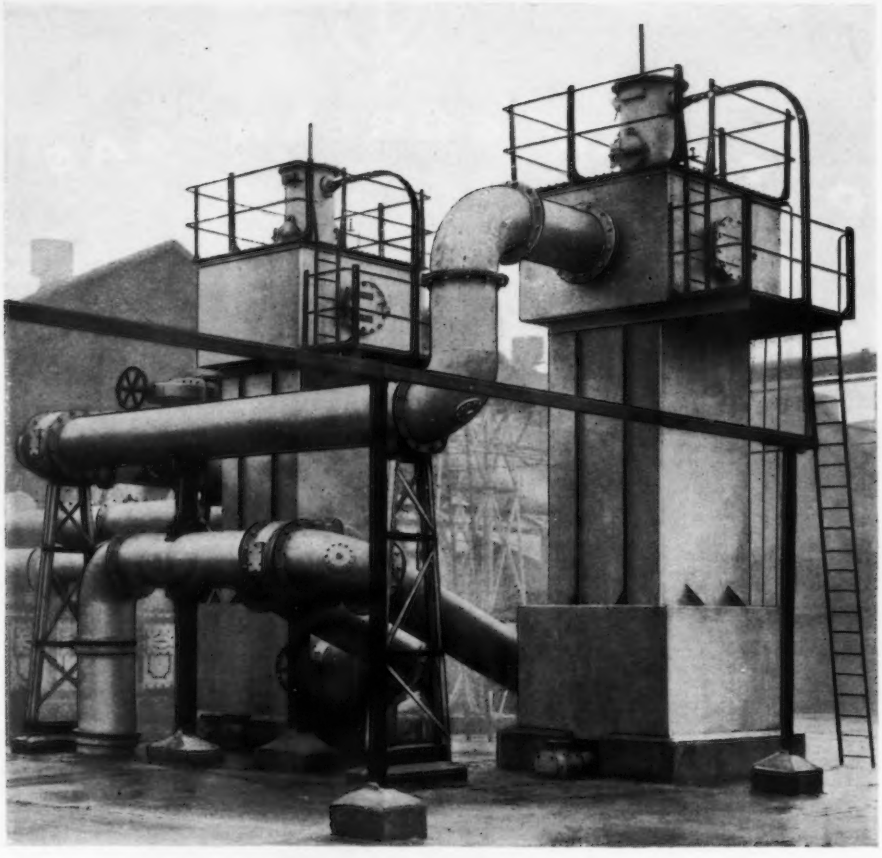
- HIGH SPEED VERTICAL RECIPROCATING TYPE
- AUTOMATIC CONTROL FORCED LUBRICATION EASY ACCESSIBILITY TO WORKING PARTS PERFECT BALANCE
- CAN BE SUPPLIED DRIVEN BY STEAM, GAS ENGINE OR ELECTRIC MOTOR

The **BRYAN DONKIN CO LTD** · Chesterfield

LONDON MANCHESTER MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES

ELECTRO-DETARRERS

The hallmark of high quality plant



TWO MODERN ELECTRO-DETARRERS BY R. & J. D. LTD.

Our ELECTRO-DETARRERS comply with all Safety Regulations imposed by the Factory Acts and recommended by the Institution of Gas Engineers, and are fitted with high quality electrical equipment by the Metropolitan-Vickers Electrical Co. Ltd., the H. V. rectifier units being of compact metal-clad construction, self-screened, and suitable for outdoor installation.

We also make: BY-PRODUCT PLANT · CONDENSERS · GASHOLDERS · GAS VALVES · IRON CASTINGS · PURIFIERS STILLS · TANKS · WASHERS · WATER - GAS PLANT · and RIVETED and WELDED STEELWORK.

R. & J.
DEMPSTER
Ltd.

Constructional Gas & Chemical Engineers

GAS PLANT WORKS · NEWTON HEATH
MANCHESTER · 10

London Office : 34 Victoria Street, S.W.1

The CERTIFIED PERFORMANCE NEW

PORTABLE SCREEN GAS FIRE

SUGG WESTMINSTER

Finished in lustre bronze with gold relief, it is designed to stand in the fireplace and gives fire-side comfort combined with low running costs.

A safety guard is fitted.

Available from leading retailers and your local Gas Showrooms or direct from the manufacturers.

WILLIAM SUGG & COMPANY LIMITED

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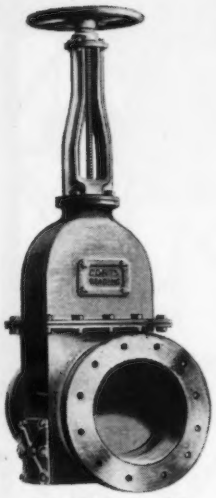
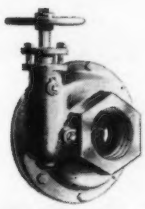
CORT'S GAS VALVES



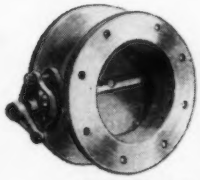
DOUBLE GATE

TOWNDROW ROTARY



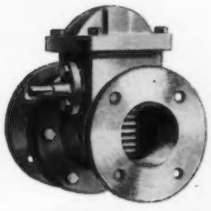
TOWNDROW SERVICE

SYPHON COCK



THROTTLE

LIQUOR



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Cort's keep large stocks and so ensure prompt service

ROBERT CORT & Son Ltd

READING · ENGLAND

Telephone: Reading 5046 (5 lines) Telegrams: "Corts, Reading"

THE SIMON PATENT AUTOMATIC COKE WEIGHER

Approved by the Board of Trade and stamped by the Weights and Measures Authorities.

Capacity: 28 to 112 lbs. per discharge (nett).

Speed of Weighing: Up to six weighings per minute.

Guaranteed accuracy and continuity of operation.

Machines may be seen working by appointment.

RICHARD SIMON & SONS LTD.

PHOENIX WORKS · BASFORD · NOTTINGHAM

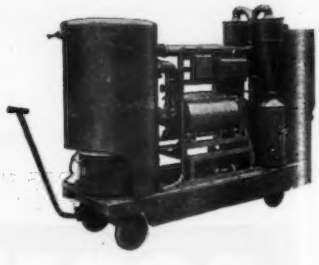
REMOVES DUST FROM ANYWHERE

REMOVES HOT SOOT AND ASH

Designed specially for GAS WORKS

B.V.C. DUAL-PURPOSE
VACUUM CLEANER

Model T.87 has been specially designed to be of maximum service in gas works. It is a highly efficient, large capacity, mobile unit with a water cooled container for receiving hot dust and smouldering ashes. Can be used by up to four operators for surface cleaning.



B.V.C. FLUE DUST REMOVAL PLANT used by: North Thames Gas Board (Beckton Nine Elms, Southall, Brentford and Stepney) West Midlands Gas Board (Birmingham) Wales Gas Board (Cardiff). North Western Gas Board (Birkenhead). Southern Gas Board (Reading). Etc. Etc.

B.V.C "BRITISH VACUUM CLEANER"

INDUSTRIAL VACUUM CLEANERS

The British Vacuum Cleaner & Engineering Co., Ltd. Dept. 63 R, Goblin Works, Leatherhead, Surrey

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CAPSTAN WINCHES

Built with accepted ACE reliability, the conservative rating and generous proportions of these robustly constructed winches guarantees continuous, trouble-free operation at full load. Designed for box enclosure or direct mounting in pit, they are ideally suited for truck and barge haulage in railway sidings, docks and harbours; and for moving furnace bogeys, mining trucks and kiln cars.

Capacity **1 to 5 tons**
Rope Speeds
45 to 160 ft. per min.
For A.C.
or D.C. operation

Variable speed units employing dual motors can be supplied against specific enquiries.
FREE RUNNING FAIRLEAD ASSEMBLIES ARE AVAILABLE.
Please write for descriptive Leaflet No. 9667

ACE
ELECTRIC CAPSTAN WINCHES

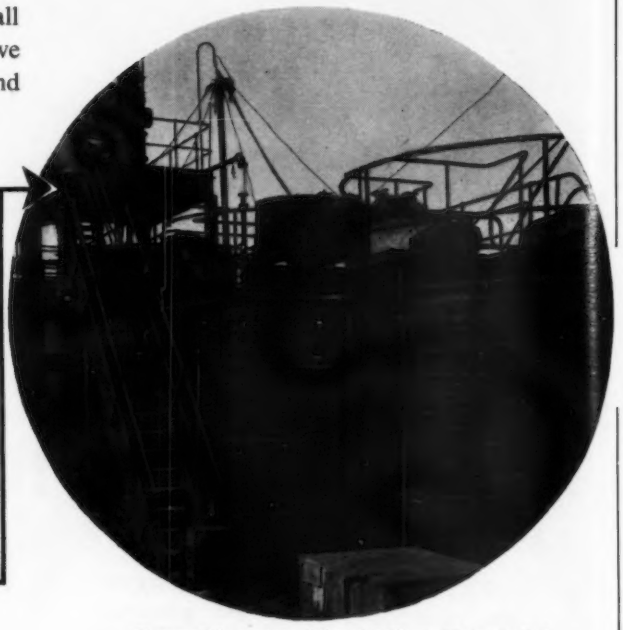
—always pull their weight

A.C.E. MACHINERY LIMITED., HARLEQUIN AVENUE, GREAT WEST ROAD, BRENTFORD, MIDDX
Telephone: EALing 6262 (5 lines) *And at BRIXTON, S.W.2.*

DENSO ANTI-CORROSION

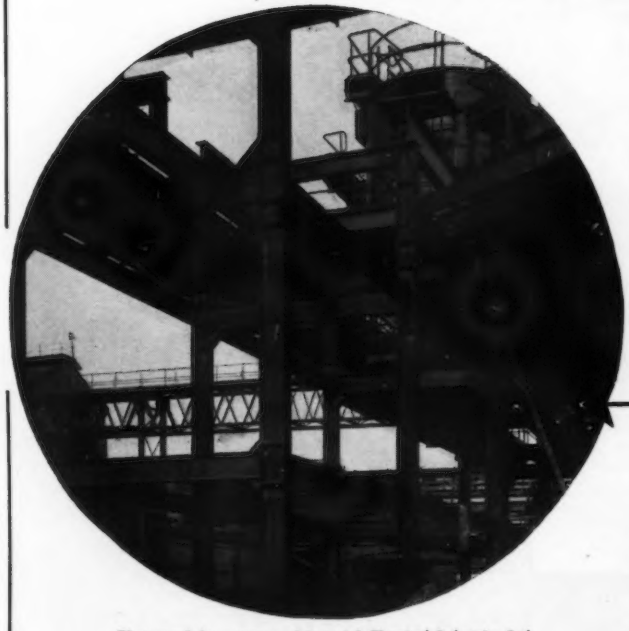
DENSO PRODUCTS ENSURE permanent protection for pipes, mains, cables and all structural steelwork, both below and above ground, against atmospheric, industrial and electrolytical corrosion.

THE TANKS, THE SUPPORTING STEELWORK, the stair stringers, hand-rails and standards in this illustration have all been protected with DENSO TAPE, and over-wrapped with DENSELT TAPE to provide extra mechanical and dielectric strength.



Photograph by courtesy of Imperial Chemical Industries Ltd.

PRODUCTS



Photograph by courtesy of Imperial Chemical Industries Ltd.

THE PERMANENT PLASTICITY of DENSO TAPE ensures that it follows faithfully all irregularities of the underlying metal, making it an ideal protective covering for structural steelwork of every kind. The structural steelwork in this illustration has been over-wrapped with DENSELT TAPE to provide extra mechanical and dielectric strength

Full information from

WINN & COALES LTD.

DENSO HOUSE, CHAPEL ROAD, LONDON, S.E.27

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the first name in mechanical shovelling

The pioneering of thirty years has gone into the latest Chaseside shovel — and nothing can replace those thirty years of shrewd, specialised, engineering "know-how". That indeed is why the present Chaseside is exactly as it is — in no other way, we have found, can a shovel be made so tough, so powerful; in no other way can it be made so simple, so reliable, and so economical in overall cost-per-ton-handled whether on heavy work or easy. We are always happy to prove this, though the purchase by Gas Undertakings of some 225 Chaseside Shovels is in itself significant . . .

LIFT. *Like big power shovels the Chaseside scoop is cable operated—but with hydraulic "finger-tip" controls.*

ACTION. *The scoop digs fully, straight into the heap. The buffer bar, backing up the scoop, throws the whole weight of the machine into the operation.*

SPEED. *Comparative tests show that the Chaseside can* dependably *handle most tons per hour.*

COSTS. *In overall economy, and in staying power, the Chaseside is without equal.*

and the last word in shovels

CHASESIDE

Chaseside Engineering Co. Ltd., Station Works, Hertford, Hertfordshire. Telephone: Hertford 3113 (6 lines). Service Factories at Church St., Ware, Herts. 'Phone: Ware 720 and Failsworth, Manchester. Telephone: Failsworth 3721

"NORMAL SERVICE *will be resumed* IN 2 MINUTES*"

* *Time to fit a* SECUREX *Joint*

"You just need to look in my little tool bag to know what my line is" says Alf our Photogenic plumber. "One patent tool and a spanner and I'm all set to focus my attention on any pipe that shows an area of high pressure. The next part of the programme will be rust-proof, fire-proof and unaffected by side strain or heat changes in water, gas, steam or — hot air. Just give me two minutes and by Securex, I'll fix this joint."

For the perfect joint, coupled with Copper Piping, always specify "Securex."

SECUREX SOLDERLESS COMPRESSION JOINTS

JAMES H. LAMONT & CO. LTD.
ENGINEERS — BRASSFOUNDERS

GYLEMUIR WORKS, CORSTORPHINE, EDINBURGH 12, SCOTLAND
Telephone: Corstorphine 66641-2 *Telegrams:* "Solderless, Edinburgh"

London Office: NORFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.4
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LININGS · SPLASHBACKS · TRAYS · LININGS · SPLASHBACKS · TRAYS · LININGS · SPLASHBACKS · TRAYS ·

HOWDEN

CENTICELL

DUST COLLECTOR

The 'Centicell' in combination with extraction hoods, is the ideal plant for eliminating the dust nuisance on coke-screening plant. The 'Centicell' can also be fitted at the inlet or outlet of waste-heat boilers, preventing the emission of dust from the chimneys of retort settings.

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HOWDEN

High Pressure Storage

COMPLETE INSTALLATIONS
DESIGNED FOR
TOWN OR COUNTRY
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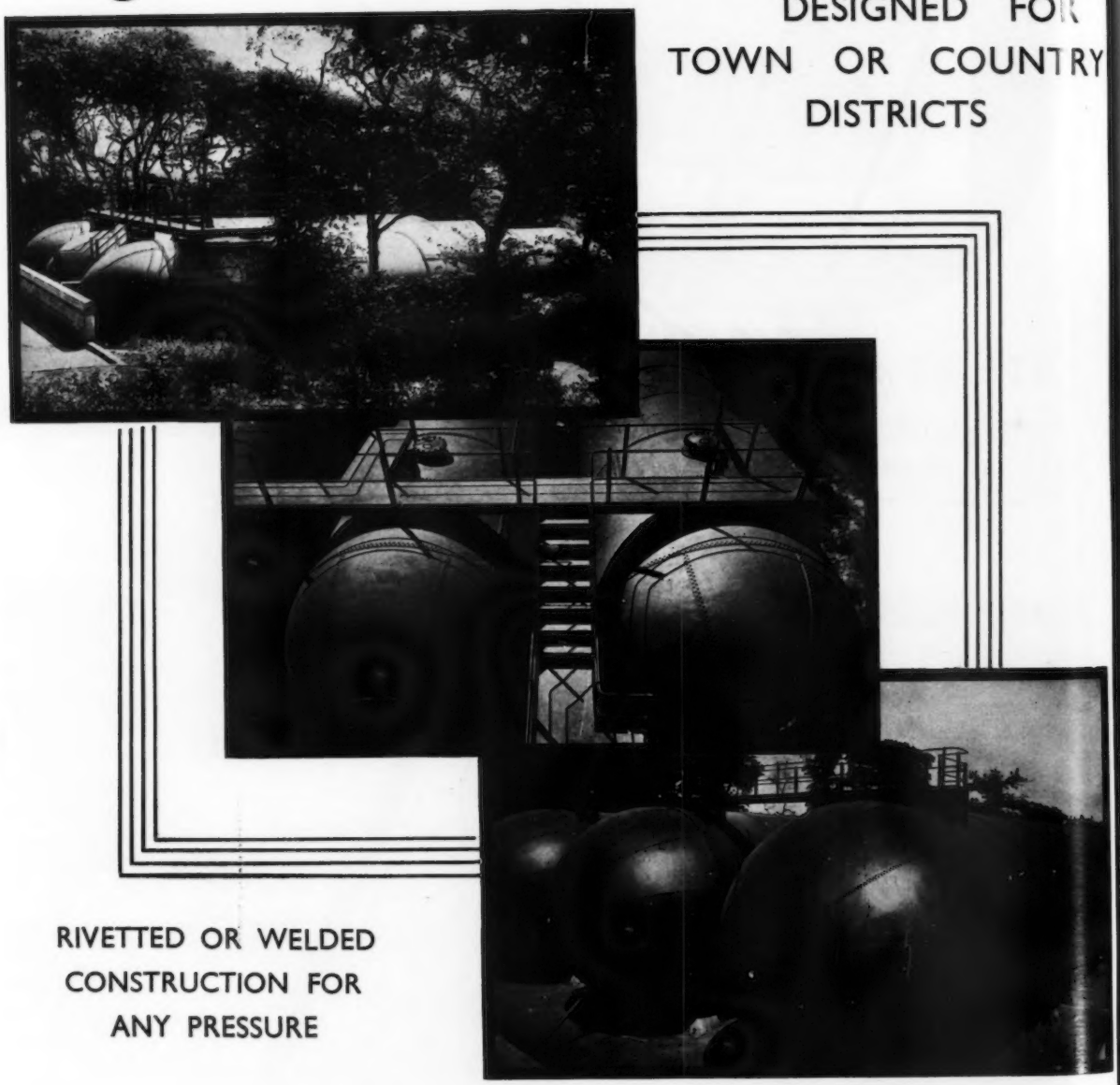


RIVETTED OR WELDED
CONSTRUCTION FOR
ANY PRESSURE

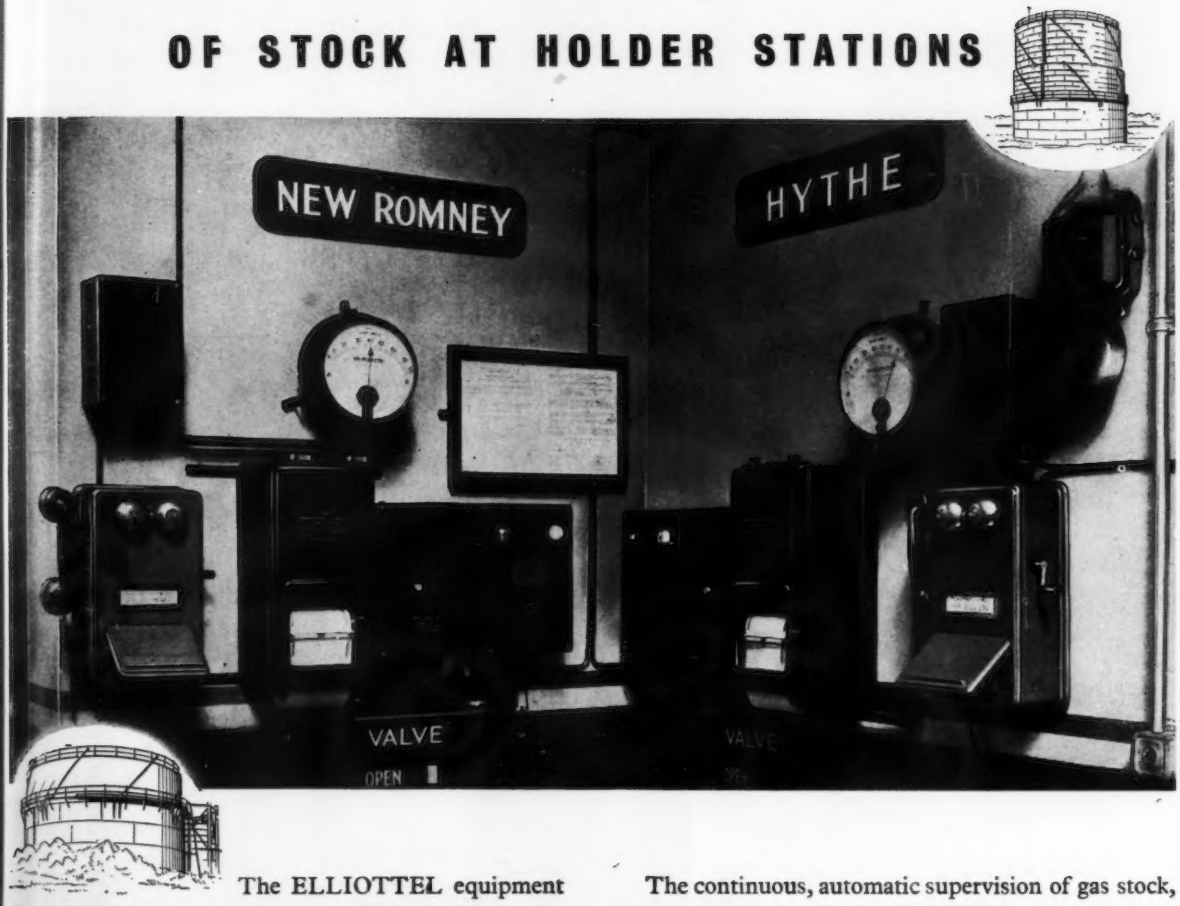
CLAYTON SON & Co. LTD.,

MOOR END WORKS, HUNSLET,

LEEDS, 10.

SOUTH EASTERN GAS BOARD

EMPLOY THE *Elliottel* SYSTEM OF REMOTE INDICATION, RECORDING AND CONTROL OF STOCK AT HOLDER STATIONS



The ELLIOTTEL equipment installed by Elliott Brothers (London) Limited in the Compressor House at Folkestone Gas Works indicates, records and controls gas holder stocks at Hythe and New Romney (approximately 7 and 13 miles respectively from Folkestone).

The ELLIOTTEL system gives visible and audible warning of maximum and minimum positions in the holders, remote control of the inlet valves and simultaneous telephonic communications.

The continuous, automatic supervision of gas stock, made possible by the ELLIOTTEL system, ensures economy in distribution costs, and releases staff for other duties. Supply transmission or line failure is indicated immediately.

All these facilities are provided over only one pair of G.P.O. lines per station.

The ELLIOTTEL system is the simplest of its type, and is also available for remote indication and recording of flow and pressure, and control of governors.

Publication DE-1, free on request.

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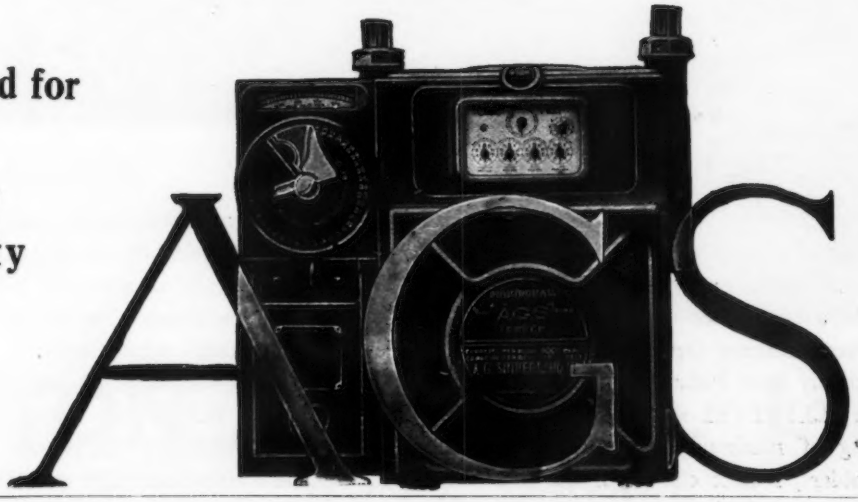
It's handy.. It's neat..
It's attractive.. THE Duette

A beautifully designed Hot-plate for office, flat, or the "one roomer". Its high performance, excellent quality and modest price, makes it a most useful and desirable appliance. In cream vitreous enamel finish with brown pan supports and burners.

A product of
FLAVELS of LEAMINGTON
MAKERS OF FINE QUALITY COOKING AND HEATING APPLIANCES SINCE 1777

"AGS" Gas Meters

Unsurpassed for
Quality
Accuracy
Reliability



A. G. SUTHERLAND LTD.

Head Office: Warwick Road, Greet, BIRMINGHAM, 11, and at LONDON and NOTTINGHAM

'Segas' plant in operation at the Sydenham Works of the South Eastern Gas Board

PGC

SEGAS

Catalytic Oil-Gas Process

This new development which utilises heavy oil is now available to the industry for the production of gases with characteristics similar to those of towns gas

THE POWER-GAS CORPORATION LTD

STOCKTON-ON-TEES

Fyffe's fittings

for speed and efficiency

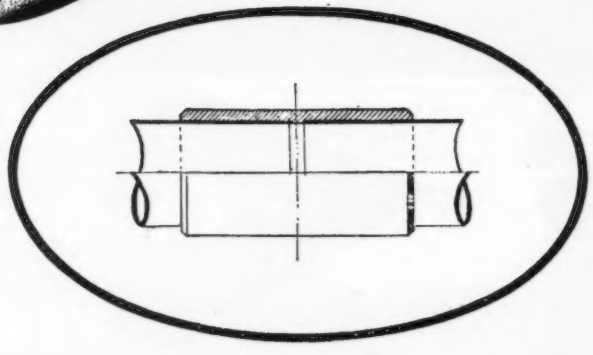
Pre-tinned, and ready for immediate use.

Provides the simplest method of making a capillary joint.

There's no need to clean the bore of the fitting.

Does not deteriorate on the inside surface while in stock.

'INTEX P.T.'



Fyffe's fittings

for ease and economy

Fyffe's manufacture a complete range of compression and capillary fittings in the "D.D.", "CONEOR", "INSTANTOR" and "INTEX P.T." patterns. For trouble-free service specify a Fyffe fitting.

ICI

FYFFE & CO. LTD. DUNDEE A SUBSIDIARY COMPANY OF IMPERIAL CHEMICAL INDUSTRIES LIMITED

50,000

LEAK CLAMPS CAN'T BE WRONG!

Over 50,000 Leak Clamps in use by the Gas Industry in this country have been manufactured by the Consolidated Pneumatic Tool Co., Ltd. Based on the original American design, CP Leak Clamps now embody 15 years of experience, and the many modifications, and adjustments in their development has resulted in a Clamp ideally suited to the special needs of the British Gas Industry. For complete protection, specify only C.P. Flexible Leak Clamps and prevent unaccounted-for gas, not only now, but for years to come.

C.P. Leak Clamps are available in all sizes, from 3" to 48" diameter for the socket and spigot joints of British Standard Mains. Patterns also available of numerous sizes for special joints. C.P. Leak Clamps are manufactured in the U.K. by the Consolidated Pneumatic Tool Co., Ltd., and are available only through the sole distributors below, who will be pleased to supply full particulars and illustrated literature.

Sole distributors to the Gas Industry :—

ABBOTT, BIRKS AND COMPANY LIMITED

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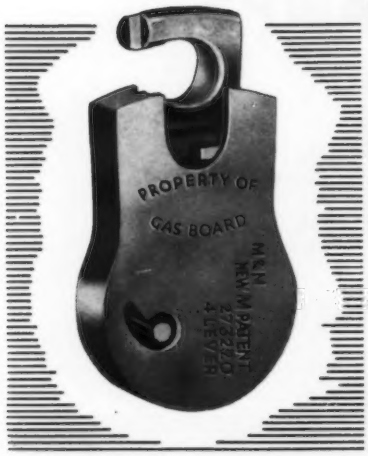
M & M PATENT METER LOCKS

use the STRONGEST, SAFEST METER LOCK



- DON'T buy locks you may have to scrap in a few years
- DON'T look only at the initial cost
- DON'T think only of the present time; look to the future
- DO remember that good quality is cheapest in the long run
- DO take our word for it that our workmanship is consistently good
- DO profit by others' experience and use M. & M Locks to protect your meters

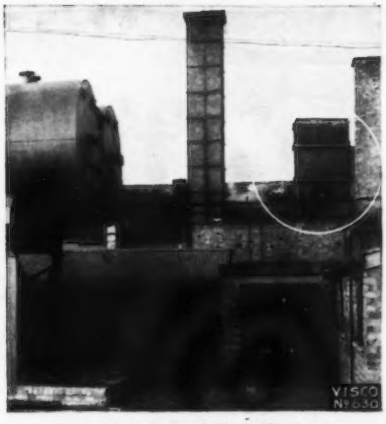
H. MITCHELL & CO.
36, 38, NEW CHARLES STREET, LONDON, E.C.1

Specialists in the repair of defective Reinforced Concrete Buildings and Structures, etc.
also
LININGS FOR STEEL BUNKERS.

THE GUNITE CONSTRUCTION CO. LTD
WESTERN HOUSE, HITCHIN, HERTS.

VISCO
Water Cooling.

The Cooler that Cuts Cooling Water Costs



The "Visco" Steel Shell Cooler is shown within the white circle.

The illustration shows yet another application of the "Visco" Steel Shell Forced Draught Water Cooler. This unit is operating in conjuction with a waste heat recovery system at the new power house of the Coventry Radiator & Presswork Ltd. When the works heaters are unable to dissipate all the heat from the six diesel generators, the "Visco" cooler automatically takes over and can deal with all six diesels when the heaters are not required. The saving as against the use of mains water running to waste is about 97%.

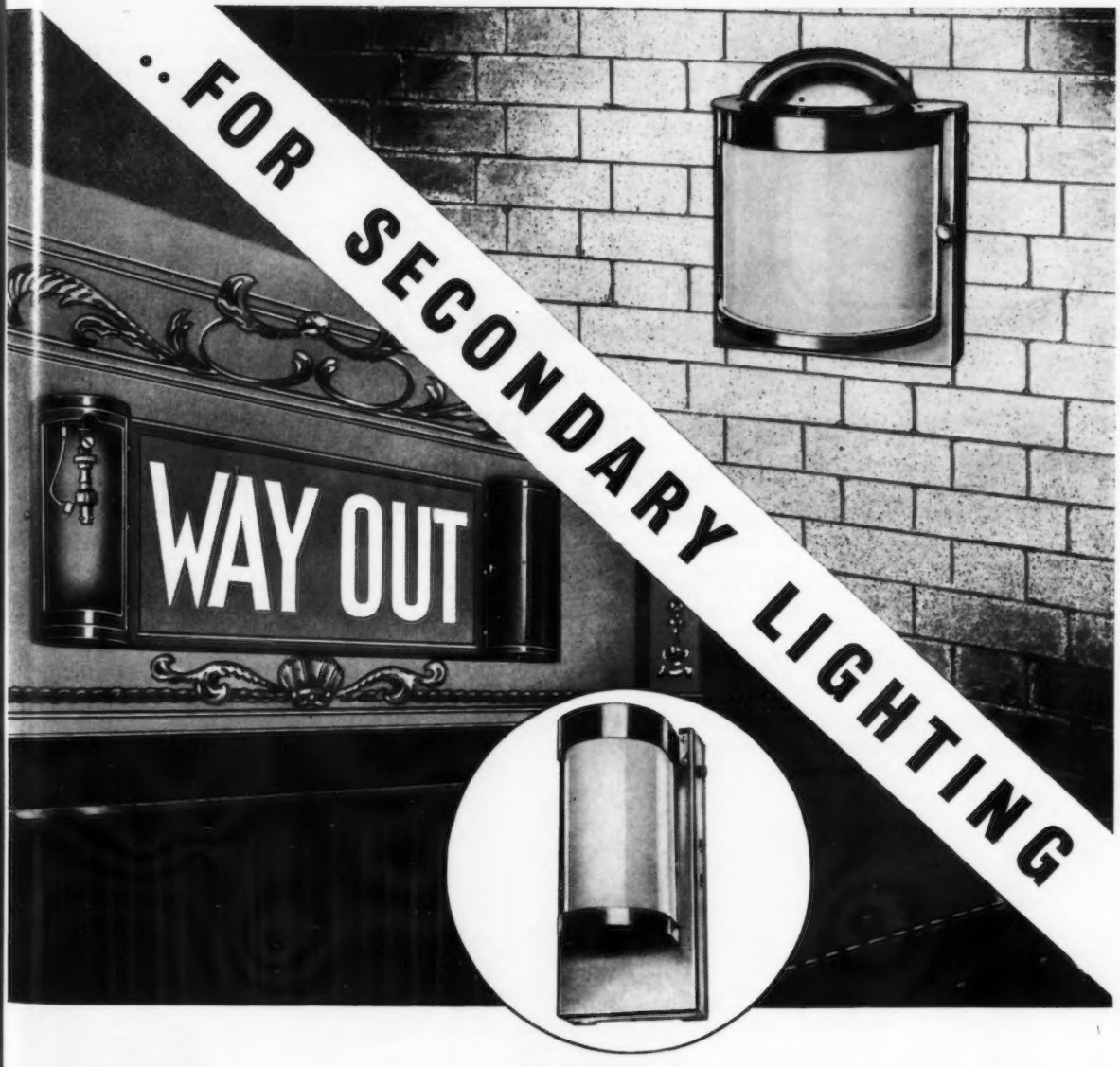
Ask for list No. 514. In addition to these Steel Shell Coolers we can supply cooling towers in timber or ferro-concrete of any capacity to 500,000 g.p.h.

We invite your enquiries.

Phones: CROydon 4181/4

VISCO ENGINEERING CO. LTD. STAFFORD RD. CROYDON

PUT EDGAR FIRST..



Edgar equipment promotes public safety at many leading
INSTITUTIONS . SCHOOLS
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SETTLEMENTS . ETC. ETC.

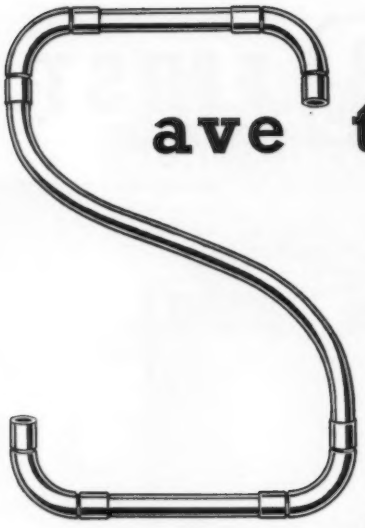
Three items from the William Edgar range of Emergency and Secondary Lighting Equipment.

- EXTERIOR wall fitting BW50
- WAY OUT or EXIT sign
- INTERIOR wall fitting BW39

Supplied standard or to specification.
Full details and prices on request.

See our permanent exhibit at the Building Centre, 26 Store St., Tottenham Court Road, W.C.1

WILLIAM EDGAR & Son Ltd., Blenheim Works, Hammersmith, W.6
Telephone: Riverside 3486



ave time and cost . . .

Specially designed for the Gas Industry, M B L Capillary Fittings ensure a quicker, efficient and permanent joint. A full range of fittings from $\frac{1}{8}$" diameter are always in stock. Made to B.S.S. 864 for Capillary joints. All Copper tubing is made to B.S.S. 659 and specially suitable for use with M B L fittings. Write for details.

. . . with MBL COPPER TUBES AND CAPILLARY FITTINGS

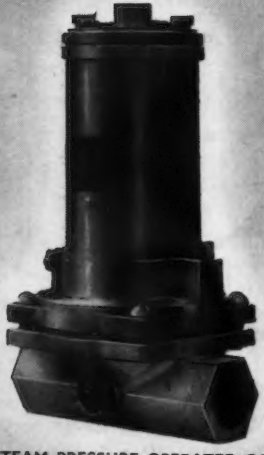
THE MINT, BIRMINGHAM, LTD., BIRMINGHAM, 18.

Phone : CENTRAL 2532 ● Grams : "MINT", BIRMINGHAM, 18 ● BRANCHES AT : LONDON ● GLASGOW ● MANCHESTER

Instrument specialists for the Gas Industry since 1877

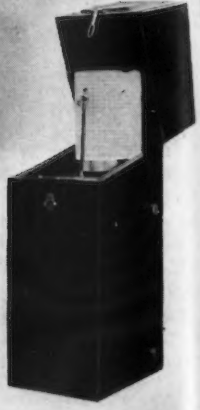
DIRECT READING INCLINED GAUGE

CUT-OFF VALVE



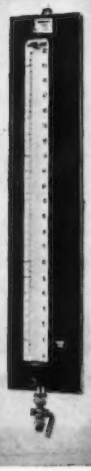
STEAM PRESSURE OPERATED GAS CONTROL VALVE

RELAY VALVE



PRESSURE RECORDERS

FLOW INDICATORS



SINGLE COLUMN PRESSURE GAUGE

DOMESTIC AND INDUSTRIAL THERMOSTATS

What do you ask of a water heater?

Hot water immediately!
Boiling water in 30 seconds!
Economy in fuel consumption!
Ease of operation!
Automatic instantaneous action!
Reliability!
Low maintenance costs!

the AINTREE SUPPLIES ALL THE ANSWERS

Manufactured by
J. H. ROBINSON & CO. (LIVERPOOL) LTD.
MILL LANE OLD SWAN LIVERPOOL, 13

MAKERS OF THE FAMOUS ROBINSON GAS METER

Sales Office: 85, MOSLEY STREET, MANCHESTER, 2
Office and Works for SCOTLAND: 3-5, NICOLL PLACE, EDINBURGH, 6

MONK

OF

WARRINGTON AND LONDON

are organised and equipped to carry out

CIVIL ENGINEERING · REINFORCED CONCRETE
AND BUILDING CONSTRUCTION

connected with

THE GAS INDUSTRY

Entrust this important part of your expansion programme to this organisation which has been responsible for the construction of many major projects at home and overseas.

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SISSON STEAM ENGINES

DESIGNED
for
driving
EXHAUSTERS
BOOSTERS
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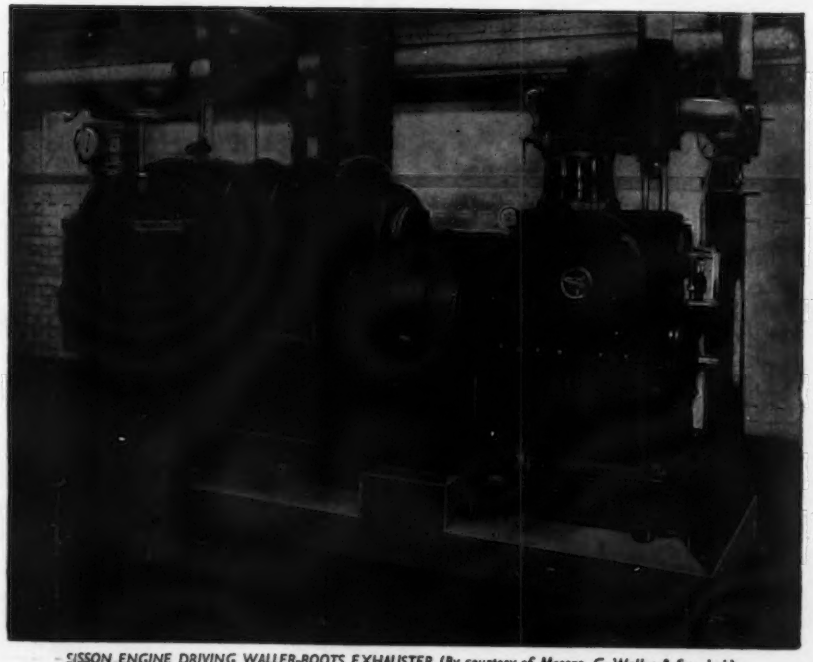

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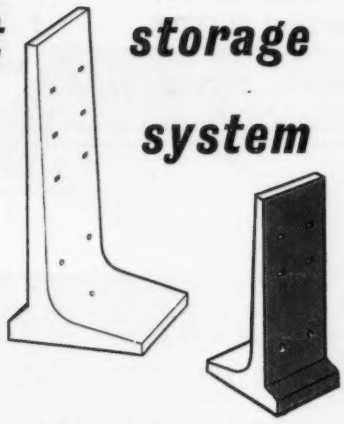

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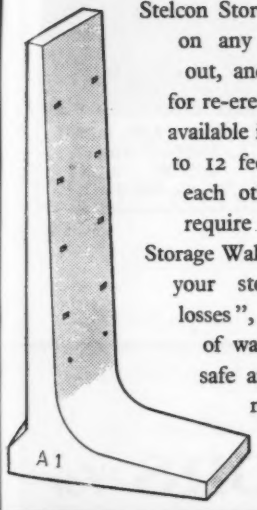

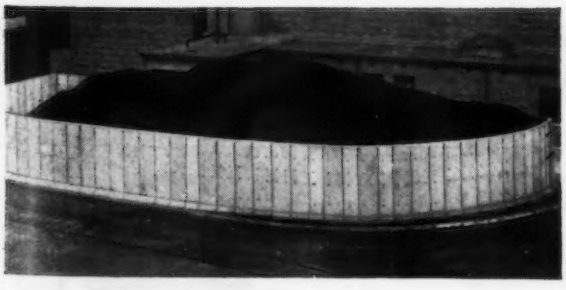

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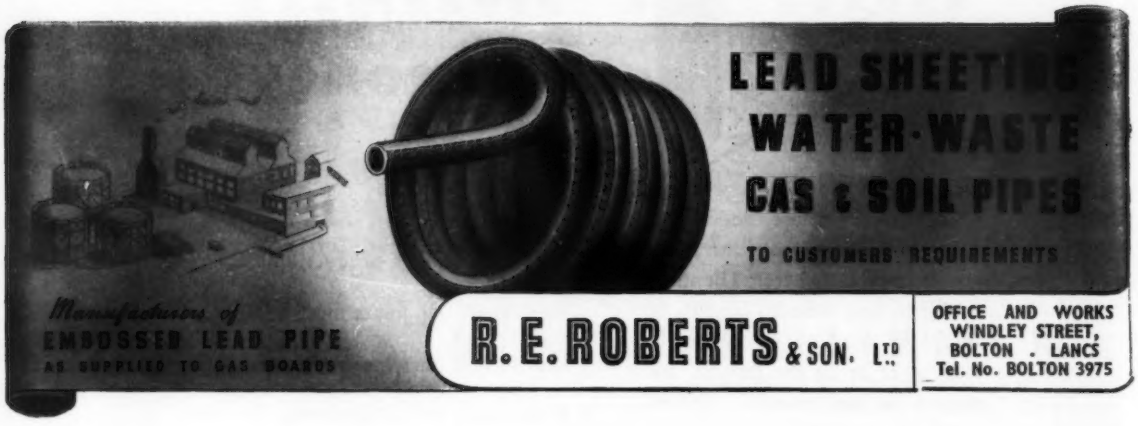

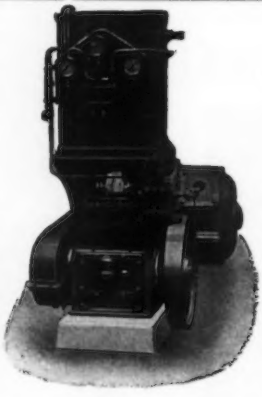

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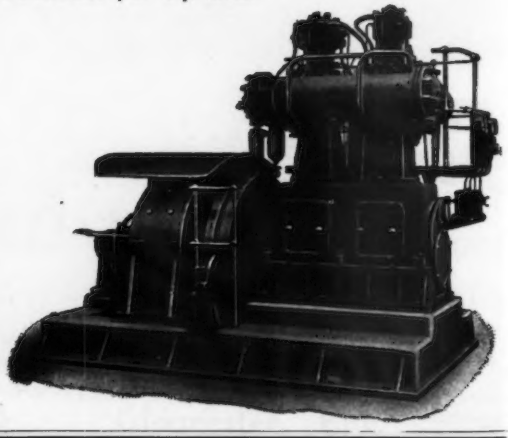

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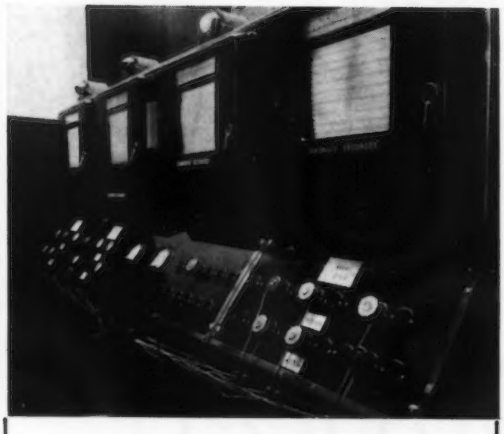

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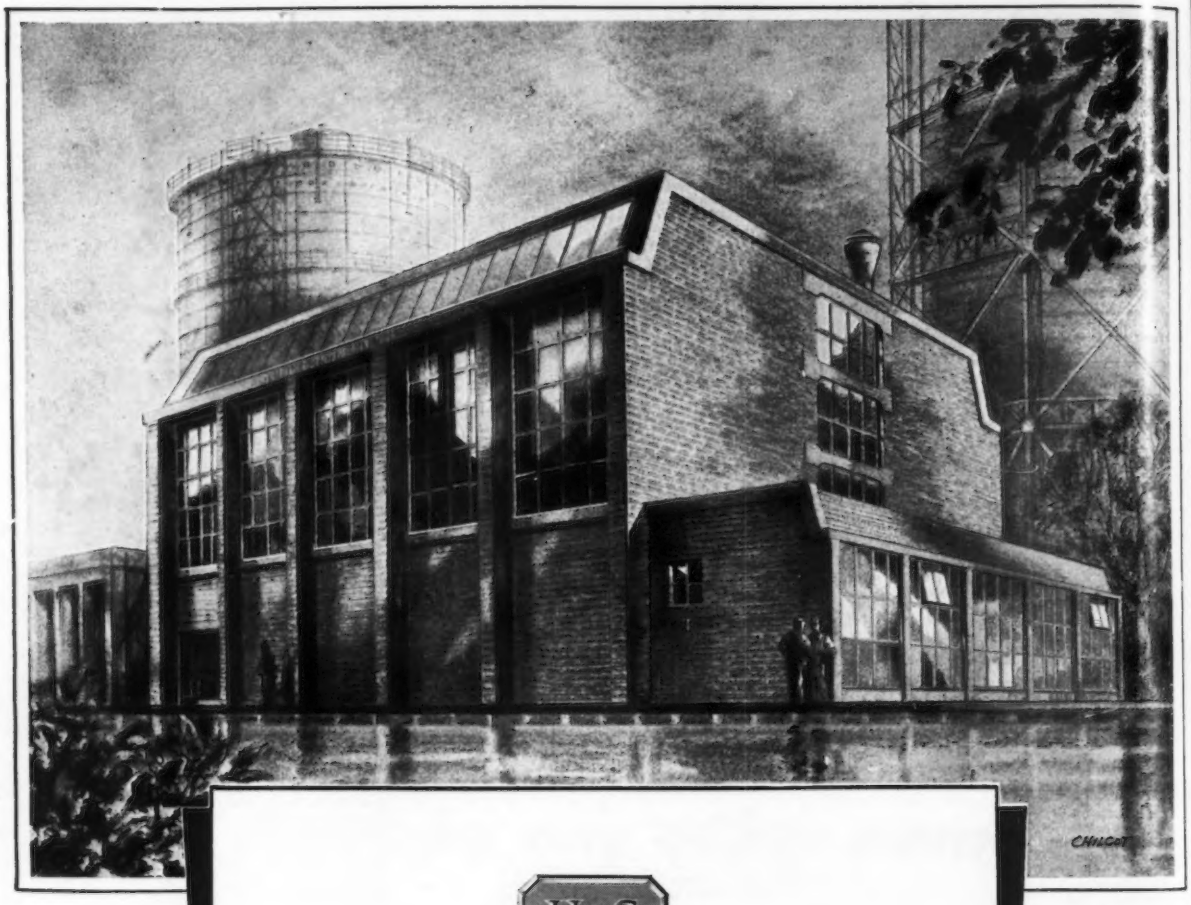

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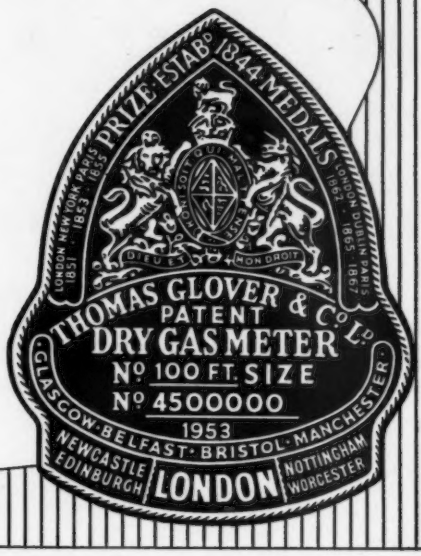

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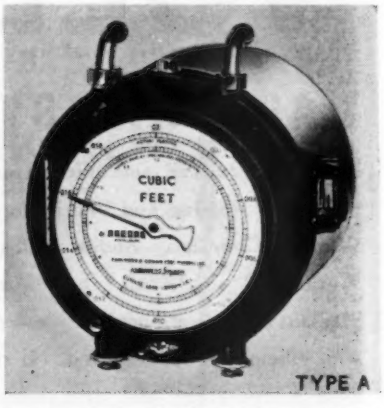

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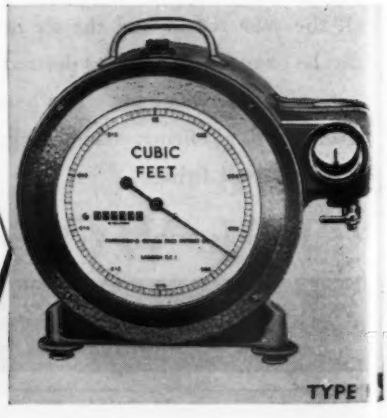

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VOL. 277. No. 4729 106TH YEAR January 20, 1954

COOKER COMPETITION

A domestic fuel survey made impartially in 1952 and published by the Coal Utilisation Council showed that the usual cooking methods of British householders were: by gas, 72%; by electricity, 14%; solid fuel, 15%; and by oil, 1%. (The excess over 100% is due to the fact that some of the people who were interviewed quoted more than one usual method.) These figures can be converted into numbers of householders using the different fuels as follows: gas, 10.4 mill.; electricity, 2 mill.; solid fuel, 2.2 mill.; and oil, 0.1 mill., and they correspond closely with those quoted in a recent article on competition in cookers published in the *Financial Times*, which stated that the ratio of gas to electric cookers can today be put roughly at about five to one.

With the lifting last October of the restrictions on promotional advertising that had been imposed by the Minister of Fuel and Power on the nationalised gas and electricity industries a new era of competition has been opened, and although wherever any form of mass observation has been made there has been a decisive majority in favour of gas for cooking, there can be no doubt that the electricity boards will intensify their efforts to acquire a greater share of the cooking load in the months ahead. Actually what has happened so far is that with the lifting of the advertising restrictions and the easing of the material situation production has been stepped up and, so far as our own industry is concerned, the replacement of obsolete black cookers with appliances of more modern design and higher efficiency has been accelerated. The *Financial Times* article says that the production of gas cookers rose from a monthly average of about 68,000 in 1950 to 71,000 in 1951, and then dropped to 60,000 in 1952. Production of electric cookers similarly rose from 1950 (a monthly average of about 23,000) to 1951 (about 26,000), and then declined in 1952 to just over 14,000. In October, 1953, 80,800 gas cookers were produced, as against 28,800 electric cookers, and production of both was well above the average for the first ten months of 1953. 'After a series of severe setbacks since the war,' the article continues, 'the electric cooker market is now showing signs of sure recovery. This is partly the result of the lifting of the ban on promotional advertising, but probably more important is the large increase in housing construction, the improvement in the design of the appliances themselves, and the moving of stocks that have been clogging the distributing channels.'

The electricity power cuts imposed during the winter of 1946-47 materially affected the demand for electric cookers, and it is only recently that it has begun to recover. An important factor in the increased demand is the progress of the rural electrification programme. In 1952, electric cooker sales were running at the level of about 130,000 a year; towards the end of 1953 they were running at twice that level.

Gas cooker sales up to the end of October are put at an annual rate of 548,000, and it is pointed out that over 90% of the sales are through the area boards, thanks to the 'comparatively uncomplicated organisation of the gas industry' which existed even before nationalisation. The electricity boards are responsible for about 50% of the sales of electric cookers, the remainder being sold through private enterprise channels, which are also now being increasingly explored by the gas industry, as instanced by the announcement, reported in our issue last week, that the East Midlands Gas Board is to appoint a number of authorised dealers, thus following the lead of several other boards.

Lest it should be thought that solid-fuel cooking is merely a survival of the past, Mr. E. Bellingham, Director-General of the Coal Utilisation Council, points out in a letter to the *Financial Times* that from 1949 to October, 1952, the average monthly production of solid-fuel cookers (including combination and back-to-back grates) has been 16,800. This compares with monthly averages of some 20,100 electric cookers and 62,700 gas cookers. Production of solid-fuel cookers has shown little variation and reflects a steady public demand.

GAS LIQUOR AS FERTILISER

Since 1923 we have followed with much interest—as, indeed, the pages of the 'GAS JOURNAL' indicate—experimental work on the use of gas liquor as an agricultural fertiliser. Owing to the problems associated with the disposal of gasworks effluents, and to the changed manufacturing and market conditions of sulphate of ammonia, more attention of late years has been paid to the application of gas liquor direct to the land. From time to time the Liquor Effluents and Ammonia Committee of the Institution of Gas Engineers has reported on the subject, much information being included in the Committee's communications in 1936 and 1946. Disposal of gas liquor in this way

was referred to by Dr. A. Marsden in the 'JOURNAL' of August 1, 1951, and in the following year we published (January 23, 1952) an article by a member of the 'JOURNAL' staff which, while bringing the information up to date at the time, included the results of experiments carried out on his own farm in Hampshire.

In our issue today (p. 91) Dr. Marsden, in a clear and comprehensive survey devoted entirely to this aspect of the use of gas liquor, puts the matter into nice perspective, and again the information is brought up to date. In his paper in 1951 Dr. Marsden mentioned that experimental work was to be put in hand in the area of the South Western Gas Board. In his present contribution he gives an account of the results. Anyone acquainted with the counties encompassed by the South Western Board will know of their rolling downs and the extent of their wind-swept arable areas. The potentialities are immense in the South West. Dr. Marsden recounts the work of the Board in conjunction with the National Agricultural Advisory Service of the Ministry of Agriculture. He explains how, with the co-operation of agricultural contractors and interested farmers, a scheme was launched for the use of gas liquor as a fertiliser. Between March and the end of September, 1953, about 660,000 gal. had been applied to 2,040 acres of grass, 106 acres of corn, and 45 acres of various crops, all with success. The trials carried out in conjunction with the N.A.A.S. have shown that for kale and cereals results are comparable with those obtained from sulphate of ammonia. With grassland, very good results are obtained with old turf; and while in established leys broad-leaved clover appears to be retarded, other types are relatively unaffected. All this, following pioneer work in Yorkshire, Lincolnshire, Hampshire, and elsewhere in this country is very interesting. And we should like particularly to draw attention to Dr. Marsden's suggestions for the future. It is not put forward that crude ammoniacal liquor is a 'cure-all' as far as nitrogenous fertilisers are concerned, but it is felt that, in many suitable cases, it represents a source of national value which merits close examination.

NEW CARBONISING PROCESSES

While the coke oven will probably never wholly justify its existence as gas-making plant it will always be necessary for the production of hard coke for the steel industry and possibly to make up the deficit of solid smokeless fuel for space heating. In the meantime every care must be taken to make full use of its secondary product, coal gas. For this reason it is a matter for some astonishment that engineers in this country still contemplate the underfiring of the coke oven with this valuable product whose only destination should be the grid of town gas supply.

In their paper to the Institute of Fuel (see later pages) Messrs. D. T. Barritt and T. Kennaway prefaced their comments on new carbonising processes with a brief description of the standard coke oven. The problem to be solved in the heating of the coke oven is to secure even and equal coking effect over the length and depth of the charges, particularly in the big-capacity oven of today. There are several solutions, generally involving an automatic reversal of upward and downward flow from gases ignited at the base or near it on one side with products of combustion returning on the other. There is one interesting system (not mentioned in this paper) in which combustion is alternated between upward and downward flow from ignition points at the top as well as at the bottom of the heating flues. The whole of the oven wall is continually in contact with fresh flames; there is neither change-over of flames from one wall to another, nor heating of alternate flues. The flames are initiated in every heating flue, changed in direction from upward to downward and reversing every half-hour. The result is said to be very good.

The limitations of the coke oven are very frankly set out. From the gas industry's point of view, the main limitation is that the coke oven is essentially a base-load plant and that even when operated under these advantageous conditions it cannot produce the gaseous therm as cheaply as the modern vertical retort. But it has the advantage that it can deal with a wider range of coals and that it lends itself better than any other system to the realisation of the advantages of coal blending. And, even though much is being done to eliminate such nuisances as the emission of smoke, dust, and steam inevitable in charging, discharging and quenching, a completely satisfactory solution to the problem is unlikely, and the coke oven is quite unsuitable for installation in urban or suburban areas. And coke oven plants must be large. 'The full benefits of the economies to be derived . . . can only be realised when they are built in large units, of the order of 1,500 tons of coal input per day.'

The useful function of the coke oven in the coal economy of this country is in the widening of the range of coals which can be converted into solid smokeless fuel or into the necessary hard coke for metallurgical purposes. British coking coals must be better used and British coal resources must be made to last longer. To do this the range of cokeable coals must be widened and it would appear evident that the best prospects of widening the coking range still further lie in the preparation of the charge itself. It is in this direction that progress has been made in this country—and even more in those countries where indigenous resources of coking coals are already limited. 'Blending and the admixture of breeze, anthracite fines, pitch, and other materials with our mixtures' is a general description of the process.

Three of the new processes discussed are briquetting processes. Briquetting is not new in this country but it is only fair to say that it formerly failed to establish itself because of the low price of household coal. Even the 'Phurnacite' process, which has for many years been successfully making carbonised ovoids in this country on a large scale from a low volatile non-coking coal, can only, we suggest, be regarded as having held its own in the market for solid fuel as prices rose to their present fantastic level. Still the process deserves success because it represents the upgrading of an otherwise intractable fuel. The National Fuels Process of New York, still in the pilot plant stage, claims to produce a carbonised briquette of substantially uniform quality and strength from any coal which has a BSI swelling number of 1 or more. Experience will show whether this claim is to be realised. Experience will also show whether the cost of the resultant briquette will be competitive in view of the quite elaborate pre-treatment of the ingredients. It is interesting to note that the successful binder is pitch in the proportion of 8 to 92—practically the same, that is, as in the briquette industry of the old days. The carbonisation process in a continuous vertical retort s

very fully analysed in the paper. The practical difficulties of discharging without breakage are scarcely mentioned and the yields of gas and by-products are not such as to contribute much to the cost of the fuel and the process.

In the Baumco process a portion of the coal is preheated to 800°C. 'in a devolatiliser to produce a char . . . . . (which) acts as an inert and rigid base for the raw briquettes . . . . . formed from a blend of char with pitch and coking coal.' The briquettes are then carbonised in a vertical retort heated both internally and externally. We seem to remember that Dr. Illingworth described some such system 20 years or more ago. Again we are told that experience only would indicate the scale of operation and maintenance costs.

The third new system, the Brennstoff-Technik, is a specialised coke oven based on the observation that coke from weakly coking coals can be improved by the use of narrow ovens working at high coking speeds, by the increase in density of the charge and by the addition of pitch to the blend. Iron-sided ovens have been used, proving satisfactory over a period of years. The iron chambers are very narrow and carbonisation is complete at temperatures (*circa* 650°C.) much lower than those necessary in the heating chambers of the full-width oven in refractory materials. The heating walls are pivotted at the top so that they can be swung apart at the base to allow the coke to drop out. The details and the results of the process are very interesting.

The conclusion of all this is that, whereas the carbonised briquettes made in this country command a ready sale as a substitute for anthracite, the process is confined to a very narrow range of coals. The study of the new processes described in the paper should be pursued with a view to widening this range and particularly to bring in the weakly coking coals which occur so abundantly and which cannot by themselves be used for coke-making in orthodox plant. In the meantime we may reiterate (a word which means not just 'repeat' but 'repeat over and over again') that we should suspend the use for combustion in the raw state of any coals in the least likely to profit the nation in their carbonisation whether for gas-making or for coke-making.

GREATER STEEL OUTPUT

Steel output in 1953 was 17,609,000 tons, which is about 1,500,000 tons more than in 1952, when reckoned on a 52-week basis, and half as much again as in 1945. This is revealed by the Iron and Steel Federation, who state that home steel production in the last quarter of the year was at the annual rate of 18,250,000 tons. This favourable outcome for 1953, the Federation point out in the current issue of their *Statistical Bulletin*, was made possible by the extra capacity provided as another stage of the industry's development programme was completed. Further additional blast furnace and steel furnace capacity will come into production this year. In every month the output of ingots and castings was above the 1952 level, and the gain over the whole 12 months was the largest recorded in any post-war year, except 1948, when production rose rapidly after the fuel crisis of 1947. In December production was the best ever recorded for the month. There was an average output of 338,900 tons a week, compared with 313,700 tons a week in December, 1952. Pig iron output, with an average of 225,400 tons a week, compared with 206,300 tons a week in December, 1952, was also a record for the month.

SQUARE DEAL FOR DEALERS

One of the results of the changing market conditions in the fuel industry is the search by certain area boards for fresh sales outlets and the favourable consideration of a scheme for authorised dealers. Such a scheme has much to commend it. By utilising the display and selling facilities of ironmongers and builders' merchants the gas industry is brought into line with the established practice of the electricity and solid fuel industries. The customer is enabled to see more gas appliances more easily, and in districts where there is no showroom, or the showroom is somewhat off the beaten track, the co-operation of a dealer ensures that the appeal of gas and concern for its interests are not lacking. Given careful selection of dealers to be included in the scheme, and insistence on proper training, it is reasonable to expect a substantial increase in appliance sales. The pioneer of this type of augmented selling was the Gas Light and Coke Company, which in pre-war days developed a formidable force of approved dealers selling on the Company's behalf. Revived by the North Thames Gas Board in 1946, the scheme now operating embraces 500 dealers (a full account of the development and operation of this scheme was published in the October, 1953, issue of GAS SERVICE). The success of this arrangement is such that other gas boards have given serious thought to introducing schemes along similar lines. Among them is the East Midlands Gas Board, which starts the ball rolling with a pilot scheme scheduled to come into operation on February 1. We were present at a meeting of the 20 or so dealers, who form the first test group, at Leicester, on January 12. At the meeting dealers' agreements were signed and the interesting queries raised were answered by Mr. H. R. Hart, Commercial Manager of the Board, who was largely responsible for devising the scheme. Mr. Hart explained that at first dealers would not be permitted to sell water heaters because it was felt that while demand for these appliances exceeds supply—and there has been a 200% increase in sales since hire-purchase restrictions were repealed—insufficient stock and inability to promise prompt delivery would be harmful to all concerned. The Board's dealers, who might ultimately number 200, would have their efforts supported by large-scale publicity, the Gas Board's own Press advertisements carrying the names of the dealers in that area. In wishing the scheme every success, we do so with confident expectation, since it is clear to us that every effort has been made to ensure that the dealers are being offered a good proposition, and that the Board will leave no stone unturned to preserve good relations and a sense of mutual trust with its new auxiliary sales force.

SEARCH FOR NATURAL GAS

LATEST developments in the Gas Council's search for natural gas in Britain began in Sussex last week. The programme is to drill a series of shallow geological holes in a rough line from a point near Wych Cross to Ticehurst to improve knowledge of the underground contours of this area, which it is thought, may contain natural gas. Following this investigation, a site will be chosen in the area for the drilling of a deep well, which is the only method by which the presence of gas can be confirmed.

Meanwhile, the two geophysical surveys in Yorkshire and Lincolnshire are progressing along the lines previously announced. Drilling at Cousland, near Edinburgh, is expected to begin at about the end of the month.

SIR IAN HEILBRON, F.R.S., Chairman of the Advisory Council for Scientific and Industrial Research, announced recently that the Government had decided to restore in full the cuts made two years ago in the programme drawn up after the war for expanding the work of the Department of Scientific and Industrial Research and of the research associations financed through the department. The associations would be able to plan their work broadly on a five-year basis.

Personal Notes

The HON. D. E. HELY-HUTCHINSON, of Farleigh Castle, Bath, has been re-appointed by the Minister of Fuel and Power as a part-time member of the South Western Gas Board.

MR. R. C. HARPER and MR. D. G. WILLSON have been elected members of the board of Fry's Metal Foundries, Ltd. MR. E. S. MINTO has been appointed Secretary of the company.

The Chairmen of nine of the area gas boards whose present appointments expire on April 30 have been reappointed by the Minister of Fuel and Power. The appointments of the Chairmen of the other three boards (East Midlands, North Western, and Southern) do not expire until after 1954. Professor F. H. GARNER has been reappointed a part-time member of the West Midlands Board.

MR. W. BESTWICK took up his appointment with the East Midlands Gas Board as Organisation and Methods Officer on January 1. Mr. Bestwick, who has had 12 years' commissioned service with the Royal Air Force, received his original training with the Organisation and Methods Division of the Treasury. From 1948 to 1952 he was engaged on organisation and methods for the Air Ministry, and has travelled both in American and on the Continent to study the subject. Before taking up his present position Mr. Bestwick, who was awarded the M.B.E. in the 1950 Birthday Honours, was a private consultant.

MR. J. C. WOOD, O.B.E., has retired from active business after serving John Fowler & Co. (Leeds), Ltd., for almost 52 years. Mr. Wood retains his position on the board, and he will attend board meetings in an advisory capacity. Joining the company's buying department in 1902, Mr. Wood became personal assistant to the Managing Director, agricultural sales representative to the company in Wales and the West of England, and eventually sales manager, a position he held for over 20 years. In 1945 he became commercial manager, followed a year later by his appointment to the board. The Fowler Veterans Club made a presentation to Mr. Wood, and he was elected President of the Club. A presentation on behalf of the directors and staff was made on Mr. Wood's last day with the firm, December 31.

MR. J. H. NOBLE, Station Engineer at Chester, has retired after serving the gas industry for 49 years. Starting his career in 1905 as a pupil of the late Mr. Fletcher W. Stephenson at Coventry, he was appointed Engineer and Works Manager of the Chester United Gas Company in 1916, and 10 years later he became Engineer and Manager, a position he continued to occupy after nationalisation under the title of Station Engineer. One of his many pupils, MR. GORDON DAVISON, now takes over at Chester from his old tutor. On January 8 at a gathering at Chester House, Mr. Noble was presented with a set of golf clubs, the presentation being made by Mr. J. Castle, General Manager of the Wirral Group. Representing the Board of the Old Chester United Gas Company was Mr. L. M. Synge, senior surviving member, who tendered sincere wishes for a long and happy retirement. Mr. T. Lionel Jones, who had been closely associated with Mr. Noble over many years as Secretary to the company, took the chair.

ALDERMAN EDWARD HAND, an official of the Northern Gas Board, has been invited to become Mayor of West Hartlepool for the coming municipal year.

MR. B. A. ROBINSON, M.I.E.E., M.I.MECH.E., who has been with the Cambridge Instrument Co., Ltd., for 41 years, and has been district representative for 32 years in the Newcastle-on-Tyne area, has retired. He is succeeded by his son, MR. W. E. ROBINSON.

MR. OWEN R. GUARD, formerly Chairman, and still a member, of the Southern Gas Board, has been elected a Director of Harrods (Buenos Aires) and its subsidiary companies, the South American Stores (Gath and Chaves) and the Chilian Stores (Gath and Chaves).

MR. LESLIE H. DANIEL, Deputy Chief Engineer of the Ministry of Supply's Fighting Vehicles Research and Development Establishment, has been appointed by the National Coal Board to be Director of the new central engineering establishment to be set up at Bretby, Derbyshire. Mr. Daniel, who is 47, joined the Ministry of Supply in 1946 as Senior Principal Scientific Officer, becoming Deputy Chief Engineer in 1949. Since 1949 his duties have included the design and development of fighting vehicles to the production stage, as well as the direction of specialist branches dealing with engines, transmission, electrical equipment, and armour. The Central Engineering Establishment will have two main functions—the development of new machinery and equipment, and testing, particularly special tests of equipment such as machinery, ropes and new materials, and improved methods of routine testing.

Obituary

MR. RALPH WILLIAMS, Chairman of the Lydney Gas Company before it was nationalised, died on January 7, at the age of 74, after a long illness. Mr. Williams was a well known business man, a prominent Freemason, and active in local organisations and in sport.

MR. DAVID MARTIN, representative of Sawer & Purves, Ltd., died on December 31. He had been employed by the company for 23 years, during which time he had been particularly associated with the areas of the East Midlands, West Midlands, and the Eastern Gas Boards. MR. F. A. RIDLEY, who has been assistant to Mr. Martin for the past two years, will take over the duties of representation of Sawer & Purves in these areas.

MR. H. R. BACKHOUSE, O.B.E., Chairman and Managing Director of Mellor Bromley & Co., Ltd., of whose group Pegson, Ltd., is a member company, died on January 5 at Leicester, aged 59. At the age of 15 he was apprenticed to an engineer in Birmingham and on leaving his apprenticeship he joined B.S.A., Ltd., in Birmingham, where his promotion was rapid. In 1928 he took up the appointment of Works Manager with Mellor Bromley & Co., Ltd., and in 1934 was made a Director. On the death in 1951 of Mr. T. C. Bromley, the founder of the firm, Mr. Backhouse succeeded him as Chairman and Managing Director.

MR. FREDERICK J. SIDDALL, who was for over 50 years associated with R. & J. Dempster, Ltd., and served in the capacity of outside representative for many years, died on January 10. He had retired in April, 1952, and had since been in residence at Southport. He was well known throughout the industry and had a great number of associations in various parts of the British Isles.

Diary

Jan. 20-29.—HOTEL RESTAURANT AND CATERING EXHIBITION, Olympia. Gas Council Exhibit.

Jan. 22.—WALES G.C.C.: City Hall, Cathay's Park, Cardiff. 11 a.m.

Jan. 23.—WESTERN JUNIORS: Visit to Taunton gasworks, 2.15 p.m. 'Principles of Instrumentation,' D. R. Jones (Bristol), Bridge Street Showroom, 3.30 p.m.

Jan. 27.—EASTERN JUNIORS: 'Design of High Pressure Bulk Supply Schemes,' R. O. Emmony, at Hitchin.

Jan. 28.—MIDLAND JUNIORS: Visit to Parkinson Stove Co., Ltd.

Jan. 28.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road. 2.30 p.m.

Jan. 28.—INSTITUTE OF FUEL: 'The Coal Problem,' D. Hicks. Gas Showrooms, Nottingham, 6.15 p.m.

Jan. 29.—SCOTTISH JUNIORS (WESTERN): Annual Dance and Buffet. The Ca'doro, Union Street, Glasgow. 7.30 p.m.

Jan. 30.—MANCHESTER JUNIORS: Visit to Blackburn Greenbank Gasworks. 'The Design and Performance of 0.5 mill. cu.ft./day Tully Carburetted Complete Gasification Plant.' G. R. Spence and G. Wheatman, Kendal Group.

Feb. 1.—WEST MIDLANDS G.C.C.: Queen's Hotel, New Street Station, Birmingham. 2.15 p.m.

Feb. 2.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 10.45 a.m.

Feb. 4.—LONDON JUNIORS: Visit to Telcon works.

Feb. 6.—SCOTTISH JUNIORS (EASTERN): 'Maintenance of Mechanical Plant.' G. A. Wood, Edinburgh.

Feb. 6.—YORKSHIRE JUNIORS: 'Accounting at Group Level,' K. L. Pickthall, Group Accountant, Huddersfield/Halifax Group, North Eastern Gas Board. At Harrogate.

Feb. 9.—WALES AND MON. JUNIORS: Short Papers by students J. R. Fisher, J. Sargent, D. Thomas and G. Griffiths. Swansea.

Feb. 9.—MIDLAND JUNIORS: 'Controls and their Application.' W. Bevan-Lewis, Sperryn & Co.

Feb. 11.—NORTH WALES JUNIORS: Visit to John Summers coke oven plant.

Feb. 12.—SCOTTISH JUNIORS (WESTERN): 'Water Gas,' W. F. Cummings, Tradeston.

Feb. 12.—LONDON JUNIORS: 'A District Manager's Impressions in a County Division,' E. J. Hoadley, South Eastern Gas Board, 178, Edgware Road, 6.30 p.m.

Feb. 12.—INSTITUTE OF FUEL: 'Aspects of a National Fuel Policy,' G. Nabarro, M.P. The University, Leeds, 6.30 p.m.

Feb. 16.—LONDON AND SOUTHERN SECTION, I.G.E.: 'The Preparation of Coal for the Gas Industry,' E. M. Myers, National Coal Board.

Feb. 17.—INSTITUTE OF FUEL: Joint Meeting with the Institute of Petroleum. 'Underground Gasification,' C. A. Masterman. Grosvenor Hotel, Chester. 7.30 p.m.

W.D. Jubilee Review

A COMPANY'S ACHIEVEMENTS can be catalogued historically or presented as a total at the end of a period of years. At the end of 50 years' industry, the Woodall-Duckham Construction Co., Ltd., has published '50 Years of Coal Carbonisation' which emphasises that it can offer no greater compliment to the pioneers who founded and developed the organisation than to present a picture of its work today.

This tasteful book, delightfully illustrated in colour, starts with a few brief notes on the Company's early days. 'Woodall-Duckham' came into being in 1903 when the original patent in connection with the Woodall-Duckham Continuous Vertical Retort was taken out by Lieut.-Col. H. W. Woodall, C.I.E., and Arthur Duckham (later Sir Arthur Duckham). This system of carbonisation, which was later to have a profound effect on the gas industry, commenced its practical life with the building, in that same year, of the experimental retort at the Bourne Valley works of the Bournemouth Gas and Water Company. There followed two further experimental plants, with all the trials and setbacks which beset inventors, and then, in 1906, the first commercial contract for the building, at the Bourne Valley works, of 16 continuously operating vertical retorts capable of carbonising 40 tons of coal per day. In the first 15 years of the Company's existence, 100 installations were ordered, and this figure was doubled in a further eight years. Now, the Woodall-Duckham continuous vertical retorts built or being built throughout the world total 558 plants in 23 different countries with an annual coal carbonising capacity of 19 mill. tons.

The year 1923 was a significant period for Woodall-Duckham. The Company widened its operations within the gas industry by entering into an agreement with Stettiner Chamotte-Fabrik of Germany to build the intermittent vertical chamber—a design of carbonising plant particularly suitable for processing cheap slack coals. The first installation of this design of carbonising plant was completed and put into operation at Ramsgate in 1926. It was also in 1923 that the Woodall-Duckham Company, by then known internationally as designers and builders of coal carbonising plants for the gas industry, decided to build also coke oven plants for metallurgical coke production. An agreement with the Koppers Company of Pittsburgh resulted in the Woodall-Duckham Company undertaking the sale and construction of Becker coke oven plants in the British Empire (excepting Canada). By the outbreak of the second world war, the Woodall-Duckham Company had built or was building W-D Becker coke oven installations to carbonise some 7½ mill. tons of coal per annum. In 1940 the Company acquired the business, drawings and technical data of the Koppers Coke Oven Company, Ltd., of Sheffield, who were building the Koppers (Essen) coke ovens in this country. And in 1947, they entered into an agreement with Koppers, G.m.b.H., Essen, for the sale and construction of ovens built in accordance with Koppers (Essen) designs in the British Empire (excepting Canada).

The extent of the contribution made by the Woodall-Duckham Company to the gas and coking industries can be assessed from the fact that one in three tons of coal carbonised in Great Britain is processed in a plant built or serviced by the Company.

Woodall-Duckham House

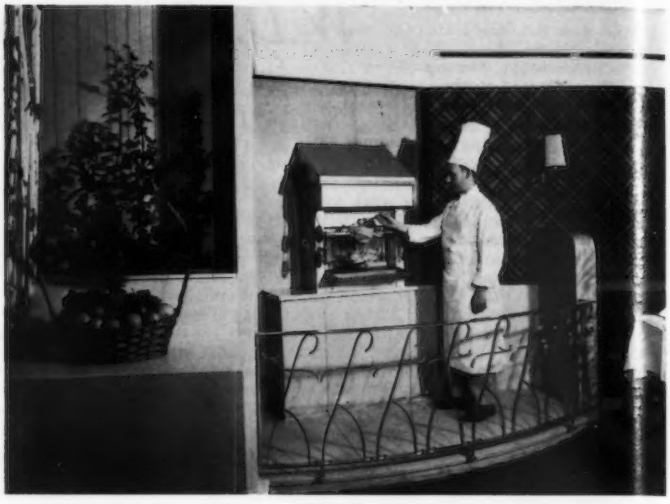
The Jubilee publication goes on to describe pictorially its most notable achievements in the building of continuous vertical retorts. After a 'cross-section of a typical installation of W-D continuous vertical retorts with step-grate producers,' there is a colour plate of the South Eastern Gas Board's installation in progress at Brighton; an artist's impression of the installation as it will appear when the third section is complete; and the continuous retort houses at the new Swan Village gasworks, the Manchester Partington works and the Chelmsford works. Another section of the review is devoted to coke ovens.

Intermittent vertical chambers are given the same sort of treatment as the vertical retorts. After a cross-section of a typical installation of W-D intermittent vertical chambers with built-in step-grate producers, there is an artist's impression of the vertical chamber houses at Tingley as they will appear when the second installation is completed. Further plates show the Ponders End works and the Weston-super-Mare works.

In fact, the Woodall-Duckham Jubilee publication succeeds in what it sets out to do. In presenting a picture of the present, it conveys the achievements of the past.

A PREVIEW OF HOTELYMPIA

GAS *AND THE CATERER*



Right: *The 'rotating' roasting spit will be one of the highlights of the Gas Council stand. Here is one in operation in one of London's famous restaurants.*

DR. JOHNSON, from whose residence round the corner we in these offices draw a tenuous thread of inspiration, was a great man for gastronomy. 'There is a time of life, Sir, when a man requires the repairs of a table,' recorded the faithful Boswell. T'was ever thus. Man's need for the delights of the table led to the growth of the gigantic catering industry, but in view of the disappointments experienced, one can only assume that force of circumstances rather than a search for pleasure is responsible for the growing practice of 'eating out.' It is, however, encouraging to note that there is a great movement concerned with raising the standard of food preparation and service in our hotels and restaurants, and preserving the real art of the chef. In many ways the Hotel and Catering Exhibition is the clearest indication of this desire to upgrade the catering industry, and the determination of the leading catering authorities is amply supported by the manufacturers of catering equipment, who by their constant research and development work have contributed greatly to the success achieved. Among these manufacturers the gas industry is strongly represented, and at the 1954 Hotelympia (as the exhibition is commonly called), to be held at Olympia, January 20-29, gas may well lead the way in showing new developments made in appliance efficiency and a progressive outlook on the catering scene.

Strong Fraternal Feeling

However, before commenting on some of the new gas appliances to be shown, a word about the exhibition itself. There is an extremely strong fraternal feeling among caterers, and Hotelympia provides what is virtually a national meeting place for friends in the industry. Most of this get-together is of an informal nature, but on a more official plane, conferences will be held during the exhibition period. The Hotel and Catering Institute and trade associations will be in conference, and one cannot help wondering why the gas industry does not itself hold a conference of gas industry personnel concerned with the catering load.

Education and training is also a well-known feature of this exhibition. There will be a complete model kitchen in which classical dishes will be prepared and cooked in public by students and apprentices of the Catering and Hotel Management Colleges. These students will be the chefs, hoteliers, and catering executives of the next decade, and it will be an interesting experience to watch them at work as, apart from the fact that gas appliances will be to the fore in this kitchen, the excellence of their work is to be commended. Numerous examples of their work will also be found in the Junior Salon Culinaire. This is the first time that the students and apprentices have had their own show, and the fact that it is separated from the established craftsmen should focus greater attention to their efforts.

Perhaps the highspot of the exhibition will be the Table d'Honneur exhibits of our leading chefs, including competitive classes embracing the whole range of classical and present-day cooking displayed in a supremely attractive manner. These will be displayed in a huge pavilion which, if experience this year is the same as in the past, will be crowded with admiring sightseers throughout the exhibition's run. In all classes there will be awards of many challenge trophies and other prizes.

Despite the attractions of the Salon Culinaire, the conference, and so on, it is the trade stands which may be expected to draw the crowds. Caterers large and small are intensely interested in new developments in catering appliances, and in the two years' gap between exhibitions, this virile industry can produce much that is new and valuable to them. There will be 247 commercial stands, making one large combined showroom of the equipment and supply trades, and of this number 52 will be displaying gas equipment of one kind or another.

First Aid for the Three 'C's'

Leading the gas exhibitors will be the Gas Council's stand (No. 153 in the National Hall), which this year has a novel theme, shedding light on the three 'C's' of catering—coffee, cabbage, and cod—and the way in which these weak spots in the English menu can be repaired and, indeed, made the envy of all. It is generally accepted that these guilty items have received more adverse criticism from holiday makers and visitors from abroad than any other food.

A series of cookery demonstrations featuring these three items will be given on the Gas Council's stand, and will show how good coffee can be made without the aid of expensive equipment; cabbage, unfairly treated as a dull vegetable, can be 'groomed for stardom'; and that cod, a most adaptable fish, treated with respect, can add glamour to the menu. These demonstrations are designed to appeal to the many small hotels, restaurants and cafés, whose resources are not large, but who cater for a great number of the public, and to whom the tourist trade is of importance. There will also be demonstrations on the art of carving, in particular, the economical carving of a roast joint straight from the oven, and methods of roasting and advice on choosing joints and poultry—all in anticipation of the day, not far distant, when meat rationing is a thing of the past and 'a cut off the joint' will really mean something. Each day during the run of the exhibition the following experts will give demonstrations: Mr. Charles Calvetti, Chef de Cuisine at Broadcasting House, Mr. Tom Roberts, Governor and Vice-Chairman of the Universal Cookery and Food Association, Mrs. Sheila Monaghan, specialist in Continental and English cookery, and the Coffee Buyers' Association.

Appliances on Gas Council Stand

The demonstration theatre will be equipped with the latest appliances designed for catering, and there will be on display a number of new appliances. They will demonstrate the ease, cleanliness and speed which can be obtained from gas equipment. Gas appliances in the demonstration theatre will include a Radiation 5127, 'Stratford' range, a Benham No. 10321 S salamander with stand, a Main GF.91 deep fat fryer, and an Electrolux L.H. 150 refrigerator. In the ordinary display on the stand will be a Stott 'Minor' boiler, a Benham 6.91 silver grill, an Ascot 709 multipoint water heater and RS.52/1 boiling water heater, a Ewart M.75 sink water heater, a Main 'Thermain' 15 storage water heater, a De La Rue No. 1/2 'Empire' storage set, a Bratt Colbran luminous panel heater, a Radiant Heating

Mastertherm' panel heater No. 2, an Electrolux L.450 refrigerator, and a Newton Chambers '55' coke fire.

Also shown on this stand will be a number of quite new appliances—the Main 93 solid top range, the 'Aquafont Junior' boiler by Ewart Catering Equipment, Ltd., which provides a continuous supply of boiling water for tea—or coffee-making, the 'Poulet-Broche' grill by the Briffault Range Co., Ltd., which cables chickens, while slowly rotated, to be grilled to perfection, and the Smith & Wellstood 'Auto Ace' boiler.

In the demonstration theatre on the Hotel and Catering Institute stand equipment will include a No. 1791 S double oven range by Benham & Sons, Ltd., a 237 'Chester' boiling table by Radiation, a Radiant Heating 'Mastertherm' radiant café grill, a Bratt Colbran 'Port Royal' fire, and an Ascot 709 multipoint water heater.

New 'Cold Zone' Fryer

Among the trade stands there will be many new items of equipment. For example, Stotts of Oldham will be showing for the first time a new deep fryer which has been designed to meet the popular specific demand of 'higher output for less fat and less fuel.' These results have been achieved by a novel form of pan embodying a hopper-shaped 'cold zone' into which food particles and sediment can settle free from the danger of carbonisation, with its consequent risk of tainting the fat and transferring taste from one food to another. The fat, therefore, need not be changed so often, and cooking heat can be maintained for longer periods, thus saving fuel. The pan can occasionally be completely drained into a strainer box and re-used. It is only necessary to top up the fat to replace that absorbed in the frying. All panelling is sheer and without protuberances and the burner is equipped with a pilot light and interlocking safety gas tap. Each deep fryer is equipped with two draining baskets having handles projecting over the front of the pan and hooks at the rear by which they are supported clear of the hot fat. In actual tests, this deep fryer has been found capable of cooking 35 lb. of chips per hour, which is approximately 25% more than other fryers of similar size.

Also on the Gas Council stand will be an example of the under-fired grill. Here is a grill of this type fitted in the Grill Room of one of London's restaurants.

Exhibits by Benhams

Benhams will be showing a cafeteria service counter embodying all the modern features for speeding service, together with a complete composite fitting constructed on the unit system and incorporating a gas-heated deep fat fryer, stainless steel working tables, two 'solid-top' range units, one unit having two open-flame burners and fry top section, bain marie and under-fired gas grill. Incorporated in the pot rack which runs the length of the fitting is a gas salamander.

Other Benham equipment exhibited will include some special all stainless steam boiling pans and kettles, which are part of the large contract the company has in hand for the Hilton Hotel, Istanbul, and a new gas pastry oven. The latter will be finished in a special colour vitreous enamel and will be one of the fittings being made for the new B.O.A.C. building at London Airport.

The highlight of the R. & A. Main stand is likely to be the new Series No. 93 heavy duty range which was fully described and illustrated in last week's JOURNAL, p. 109. A feature of the appliance is that the basic range has been 'expanded' into a series of matching units. These are (a) range with 'solid-top' hotplate, (b) range with four burners and open hotplate, (c) 'solid-top' boiling table on stand, (d) 'open-top' boiling table on stand, (e) general purpose oven (no hotplate on stand), and (f) general purposes ovens in double tier formation. From these matching items, a multi-unit combination can be built up to form the particular suite which will best meet the individual requirements of any kitchen. The following additional items of equipment can be supplied as extras: Potrack mounted on tubular standards from hotplate frame; GG.225 gas griller set in potrack over range; single central flue from four-oven central range suite; gas- or steam-heated bain marie on square section legs fitted at end of central range suite; gas- or steam-heated hot closet fitted at end of central range suite.

Also to be shown on the Main stand at the exhibition are the new series of gas grillers and toasters including various forms of the small, adaptable No. 225 and the larger all-purpose No. 222 on stand, as well as the GF. 91/R deep fat fryer, the DYW series of ranges, two-tier roasting oven, and gas-heated boiling pan.

The selection of steam cooking equipment will include gas and wet steaming ovens, a 30-gal. steam jacketed boiling pan, 6-ft. hot closet, and a steam jacketed tilting pan suite.

The Versatile 'Cafetomaton'

In the café boiler field one of the most interesting exhibits is likely to be the new 'Cafetomaton' of Jackson Boilers, Ltd. This is a self-contained, fully automatic unit which delivers an instant and continuous supply of boiling water, makes tea or coffee, heats milk, and stores them all at the correct temperatures. It combines within one compact, smoothly designed casing a 'Jackson' boiler, 'Filtomaton' coffee maker feeding two coffee containers, tea infuser and a milk heater. The containers are stainless steel lined, self-filling from a built-in feed cistern, with a positively boiling water feed to each container, fully automatically controlled by the latest 'Jacomatic' gas control system. Above counter fittings are chromium-plated with white enamel facings and red heat insulated plastic handles. The 'Cafetomaton' is designed primarily for the larger catering establishments where demand is both heavy and constant.

'Accent on Youth' might be said to be the keynote of Hotelympia this year. Here are two students at work in one of London's Hotel and Catering Schools.

Renowned for their fine design and finish, the exhibits by Radiation Group Sales, Ltd. (Large Apparatus Division), are sure of a keen audience. The well-known 'Stratford' range will offer a choice of size—models No. 5136 and 5127. The latter model is 21 in. wide inside with front-reading Regulo control, being surmounted by a hotplate 27 in. wide accommodating five ring-type boiling burners of capacities from 10,000 to 20,000 B.Th.U. per hour. Safety-pattern taps are provided for all burners.

A new appliance of considerable interest is the new stockpot stand No. 18/53. This has been designed to meet the demand for a boiling table for heating small stockpots, tea and coffee urns, and similar containers. It is strongly constructed, and comprises table with shelf, and a single drilled high efficiency ring burner with safety-pattern tap.

One size of the well-known 'Savoy' griller will be on show with heat-resisting metal frets which attain toasting temperature from cold in 60 seconds and other exhibits will include the Grosvenor range with solid hotplate, a Chester range of the type supplied in large numbers for the school feeding programme, four-deck confector pastry oven, double unit 'Kingfisher' fryer, steaming ovens and boilers, large roasting ovens, grillers, hot-cupboards and stockpot stands. The 'Lune' boiling pan, with die-cast aluminium interior, will again be exhibited.

NEW CARBONISING PROCESSES

FROM A PAPER TO THE INSTITUTE OF FUEL ON JANUARY 12, 1954, BY

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COKE OVEN plants throughout the world have for some time tended towards similarity in design, dimensions, and performance. While there are exceptions, the following general features are common to most coke oven batteries:

(1) All coke ovens built today are of the vertical-flue regenerative type (with one or two exceptions to suit strictly local circumstances) and are constructed with 95% silica refractories either throughout or at least in those parts subjected to the greatest heat. They can be fired by their own gas or by external gases such as producer or blast-furnace gas, water gas, or synthesis gas in any desired proportion, so that from about 60% to 100% of the total distillation gases can be made available as surplus without affecting the coke output. Whatever gas is used for oven heating, the flue temperature from pusher to coke side can be properly graduated to compensate for the taper of the charge, so that coking is completed simultaneously along the length of the charge without overheating the free space above it.

(2) For rich-gas heating there has been general adoption of the underjet system, in which the oven structure is built on a raised entablature containing metal pipes and jets which feed controlled quantities of rich gas to the heating flues through fireclay ducts in the regenerator pillar walls. In some designs this underjet principle is extended to lean gas and air, and various means are available of diluting rich gas with flue gases in order to control the length of the rich-gas flame in the heating flues. Automatic control of reversals, gas pressure, and chimney pull help to provide constant conditions in the heating system. There is a growing tendency towards a single waste-heat flue with controlled flow of combustion air through the cellars to provide more tolerable operating conditions in hot countries.

(3) The mechanisation of all major and most minor operations on a coke oven battery is universal, although surprisingly there is still no satisfactory method of mechanically cleaning doors and frames. Dust-collecting mains and mechanical means of rapidly charging the ovens are in general use to minimise smoke nuisance. Dry quenching of coke, though technically successful as a method of raising steam and also of preventing atmospheric pollution, is little used at present, but its ultimate adoption is probably inevitable.

(4) While considerable variations in oven dimensions are dictated by site conditions, plant capacities, etc., the optimum oven measurements are considered to be 12½ to 13½ ft. chamber height, up to 45 ft. length over sole, with a chamber width and taper to suit the coal to be coked and/or the nature of the coke required, but usually 18 in. mean. Maximum flue temperatures do not usually exceed 1,350°C. or the coking rate 1 in. per hour. The heat required to coke 1 long ton of coal containing 10% free water is approximately 23 to 25 therms, of which about 25 per cent. is lost in radiation and chimney losses and 38% in the heat of the discharged coke. The efficiency of the process as measured by the ratio of the heat in the products to the potential heat in the original coal is of the order of 90%.

(5) It is difficult to find entirely satisfactory criteria for the upper and lower limits between which a coal will make coke in coke ovens and outside which it will not, either because it will not produce a coherent coke or because it is dangerously swelling. Speaking generally, and admitting exceptions, a coal or mixture of coals will not, when top-charged into coke ovens, produce a commercially coherent coke if its B.S.I. swelling number is lower than 2½. At the other end of the scale, if the pressure produced by the coal or mixture of coals exceeds 2 lb. per sq. in. when tested under standard conditions in the Russell oven, it is likely to damage the oven walls during coking and would be unsafe to use alone.

Inherent Limitations of Coke Ovens

As producers of coke and gas, coke ovens offer several important advantages over other forms of carbonising plant. They can successfully coke a wider range of coals, are economic in labour and maintenance costs, and can operate much longer between major brickwork repairs. They do, however, suffer from certain limitations; and in looking ahead to possible novel systems, as it is the purpose of this paper to do, it is as well to be clear what these limitations are. Some are inherent and fundamental and cannot be overcome without a change of principle. Others are temporary and can be removed by developing better engineering methods or the use of new materials with properties known to be desirable but which are at present not available. Many are common to all forms of carbonising plant. No distinction is made between these limitations, which may briefly be defined as follows:—

(1) As stated previously, the upper and lower limits of coal capable of being carbonised in a normal coke oven are a B.S.I. swelling number of 2½ and a Russell oven wall pressure of not more than 2 lb. per sq. in. respectively. A considerable number of coals lie outside these limits.

(2) Coke is not a material which can be made to a standard specification. Its chemical properties vary considerably according to the nature of the coal from which it is made and the efficiency of washing before coking. Its physical properties are influenced by oven width, coking temperature, water content, and fineness of grinding of the coal (which are under the operator's control), but above all by the coking properties of the coal itself (which are not). The chemical and physical properties of the coke therefore depend overwhelmingly on the nature of the coal from which it is made, and coke ovens cannot turn out a standard product irrespective of the nature of the raw material processed.

(3) Coke as produced from any given coal in coke ovens comprises pieces of material which vary greatly in size, moisture, and ash content. Reasonable uniformity in size, so necessary for, say, efficient blast-furnace or gas-generator operation, can only be roughly achieved by screening out the smaller sizes. The yield of coke per ton of coal for the primary purpose for which the ovens were laid down is thus reduced, and the weaker the caking properties of the coal the greater the reduction will be. Moreover, coke is a material which degrades on handling and storage, and its low bulk density is a disadvantage from the domestic user's point of view.

(4) Coke ovens, being built largely in silica shapes, are subject to the disadvantages of such refractory material. Oven batteries cannot be allowed to go cold without serious risk of damage to an expensive structure, major hot repairs to individual walls are inevitably a source of anxiety, and excessive water in a free-draining coal can cause serious spalling in the lower courses of

W-D in 1953 were "on site" building 44 NEW COAL CARBONISING PLANTS with an annual coal carbonising capacity of 6½ million tons.

AS MAKING PLANTS

	Tons coal/day		Tons coal/day		Tons coal/day
√ Bilston III	86	Edinburgh IV	259	√ Penzance III	42
Boston	96	Edinburgh V	259	Rotherham	617
√ Brighton I	406	Exeter	377	Smethwick III	205
Brighton II	406	Glasgow		√ Strandvej,	
Brighton III	406	Tradeston II	179	Denmark V	50
Croydon IV	270	Greenock II	99	√ Swan Village II	576
√ Derby I	380	Grimsby VI	80	√ Tingley I	511
Derby II	380	Irvine III	18	Tingley II	511
Derby III	380	Jersey	190	Tipton II	45
Dover I	341	√ Kensal Green V	336	Tottenham V	557
Dunfermline II	40	√ Lincoln IV	138	Walsall II	821

√ Completed and put to work.

The figures following the contract names denote the number of installations built at this Works.

OKE OVENS

	Tons coal/day		Tons coal/day
Avenue, Chesterfield	2175	Lysaght IV	490
Beckton IV	603	√ Monckton, Barnsley III	218
Cardiff IV	963	Moss Bay, Workington III	1159
√ Corby V	371	Orgreave III	858
Ebbw Vale IV	444	Redbourn II	353
Fishburn, Durham	1000	Stanton II	918
√ Irlam III	390		

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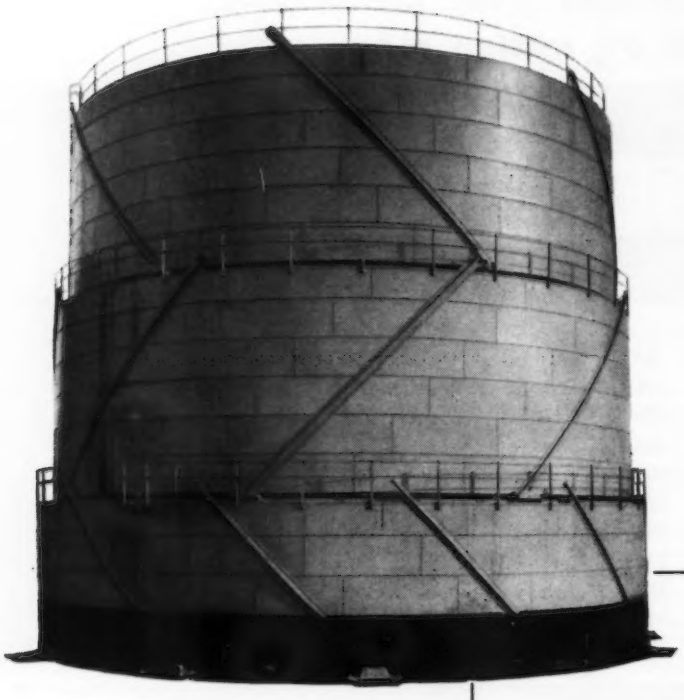

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t e walls. To obtain a satisfactory life from coke ovens, u niformity and continuity of operation are essential; i short, a battery of coke ovens, once started, must a ways be kept in work until it is finally shut down f r complete renewal.

(5) Individual coke ovens are intermittent in operation a d inevitably the act of discharging, quenching and c arging involves the emission of smoke, dust, and steam a d a certain amount of hot and dirty work for some of t e operatives. Much is being done to eliminate such n isances and the unpleasant work they cause, but a c mpletely satisfactory solution to the problem is u likely.

(6) While coke ovens can make a reactive coke from t e more weakly caking coals without difficulty, it is far f om easy to produce from the strongly caking gas coals a coke which can compare in reactivity with that made i horizontal retorts or continuous verticals from the s me material. Furthermore, although coke ovens can p ovide surprising flexibility, variations in output by c anges in their rate of working can only be achieved s owly.

(7) The full benefit of the economies to be derived from coke ovens can only be realised when they are built in large units, of the order of 1,500 tons of coal input per day.

NEW COKING PROCESSES

It is clear from the foregoing that all the advances either in design or in the use of newer and better materials have, consciously or otherwise, been accompanied by the widening of the range of coals which can produce a satisfactory coke in coke ovens. The attention which has been given in the last two decades to blending, and the admixture of breeze, anthracite fines, pitch, and other materials to our coking mixtures is perhaps an admission that, so far as the coke oven itself is concerned, everything possible has now been done to provide the optimum coking conditions and that the best prospects of widening the coking range still further lie in the preparation of the charge itself.

There is no question that British coking coals could be better used and British coal resources could be made to last considerably longer; but so long as it is proposed to alleviate atmospheric pollution by using smokeless domestic fuels, and so long as iron continues to be made by smelting ore with coke (and there appears to be no satisfactory alternative to the modern blast furnace in sight), the ultimate exhaustion of British coking coals is bound to cause concern.

The industrial problem is much more immediate in other countries such as India and South Africa, where there are ample supplies of high-grade iron ore but very limited resources of coking coals. Blending and coal preparation on an increasing scale will help to postpone the difficulties, but it is not surprising that efforts are being widely made to find a more fundamental solution by attempts to develop processes which not only produce a carbonised fuel from coals normally unsuitable for coking in orthodox plant but which overcome some of the limitations of such plant as well. The subject was considered important enough to justify a report by a Working Party of the Organisation for European Economic Co-operation early in 1953. The report, which is in tabular form, classifies all known processes into the following three categories, and gives for each system such technical details as are known: (1) Low-temperature processes. (2) New processes working on an industrial scale. (3) New processes in course of development.

Most of the processes in the first two categories are familiar to fuel technologists and call for no comment here except to observe that the second category includes the Phurnacite process, which has for many years been successfully making carbonised ovoids in this country on a large scale from a low-volatile non-coking coal. As details of the new processes in course of development are scanty, it is proposed to select three such processes mentioned in the O.E.E.C. report, to examine the principles employed, and to make an appraisal of each system in the light of existing knowledge of present coke oven practice.

The three processes chosen for study are: (1) The National Fuels process; (2) the Brennstoff-Technik process; (3) the Baumco process.

It is not suggested that any one of these processes is better than the others, or that any or all of them will necessarily displace standard coke ovens or other accepted forms of carbonising plant.

NATIONAL FUELS PROCESS

The National Fuels Process is the result of development work carried out by technicians of the National Fuels Corporation of New York and of the American Cyanamid Co. since 1936. Two pilot plants have been built, one on a semi-laboratory scale at New Haven and the other of 100 tons per day capacity at Bethlehem, Pa. The claim made for this process is that it can produce a carbonised briquette of substantially uniform quality and strength from any coal which has a B.S.I. swelling number of 1 or more. Essentially, the process reduces the B.S.I. swelling number of any coal to unity by controlled oxidation, after which the coal is briquetted with a binder and then coked under closely regulated conditions. Coke can thus be made from a wide range of coals, excluding lignites and sub-bituminous coals—*e.g.*, (*a*) low-volatile weakly caking coal; (*b*) medium-volatile coal, dangerously swelling in coke ovens; (*c*) medium-volatile coal, normally carbonised in coke ovens; (*d*) high-volatile coal of low caking power.

Whether the process is quite so comprehensive as is claimed can only be determined by experience; but it appears clear that it will treat coals outside the capabilities of standard coke ovens.

The process consists of the following steps:—

(*a*) The drying of the coal to less than 1% free moisture.

(*b*) The pulverisation of the coal so that 100% passes through a 20-mesh (Tyler) screen and not less than 90% through a 28-mesh (Tyler) screen.

(*c*) The oxidation of the coal (where necessary) to reduce the coking properties of the coal to a constant figure.

(*d*) The briquetting of the coal with a tar or pitch binder.

(*e*) The carbonisation of the briquettes in an internally heated continuous vertical retort embodying a dry-quenching unit.

The coal is dried to less than 1% free moisture before oxidation and briquetting, for two main reasons:

(*a*) The presence of water vapour in the air used for oxidation inhibits the oxidation of the coal. Therefore, the water content of the air/coal mixture must be kept to a minimum.

(*b*) It is important for the manufacture of sound briquettes that the moisture content of the binder/coal mixture be kept constant at the right value. Too much moisture in the mixture will cause the briquettes to stick to the press dies and to split across, while too little moisture will tend to make the briquettes part at the seams. The result in either case is an excessive quantity of fines, a malformed product, and subsequent retorting troubles.

The reasons why coal should be pulverised so that 100% is minus 20-mesh (Tyler) and at least 90% through 28-mesh are as follows:—

(*a*) As the oxidation of coal is primarily a surface reaction, the oxidation of larger particles of coal will be slower than for the smaller. The result will be non-uniform oxidation throughout the coal mass.

(*b*) If the coal contains material over 20-mesh, the carbonised briquettes will have a sandy and dusty surface which is easily abraded. It is considered that 90% minus 28-mesh gives a reasonable finish and that finer grinding would not be worth while.

(*c*) Pulverisation results in a thorough blending of the banded constituents of a coal and ensures a homogeneous feed of raw material for briquetting and subsequent

retorting. Coking can thus proceed uniformly throughout each briquette and uneven swelling and fusing is avoided.

(*d*) It has been found that briquettes made from finely pulverised coal can be safely processed through a critical range (between 350° and 500°C.) at a higher rate of temperature rise than is possible with coarser material, most probably as a result of more uniform oxidation due to more even sizing of the coal particles.

Coal must have a low coking power and be practically non-swelling to be successfully carbonised in the National Fuels process. Oxidation is used to bring the coking properties of any coal within the range of the process down to an optimum and constant value, and proper oxidation is vital to the success of the process. During the carbonisation of the briquettes in the retort they are subject to a rate of temperature rise of 2° to 3°C. per min. while passing through the critical temperature range (approximately 350° to 500°C.), during which they will soften. If the coal is under-oxidised the coal particles will over-soften and swell. The briquettes will not withstand the headload and will both deform and stick together. If, however, the coal is over-oxidised, its coking properties will be almost completely destroyed. No agglomeration will take place within the briquettes and the product will therefore be weak and impossible to handle without breakage.

Briquetting Binder

The function of the binder is to bind together the oxidised coal particles in such a way that the briquettes are strong enough to withstand charging to the retort and to sustain a headload without deformation until they are properly carbonised. The briquettes are formed under great pressure in the dies of the press. The coal particles are in consequence brought so closely together that the residual coking properties after oxidation are sufficient to form a carbonised product of great strength. The binder need not have any coking properties and must not dissolve the coal at any stage during its passage through the critical temperature range. Molasses and sulphite lye have been successfully used as binders, but it is usual to employ coal tar or pitch. Coal is soluble to some extent at elevated temperatures in coal tar, but this tendency is compensated for in the oxidation step.

The coal is cooled to 65°C. or less before briquetting and is mixed with binder in the ratio of 92 to 8 on a dry basis. The total quantity of water in the coal, in the binder, and from that added directly to the fluxer should result in a moisture content in the briquettes of approximately 4%. The ratio of binder to coal is not critical but the amount of water present is. Too wet a briquette will not discharge properly from the press while too dry a briquette will come apart.

The briquette should be discharged from the press at a temperature of 60° to 70°C. and must be carefully handled until cooled to 30° to 40°C. to allow the briquettes to harden. When cool, the briquettes will be hard and will stand normal handling in the plant.

Carbonisation

Before discussing the process which occurs in the N.F.C. retort, it may perhaps be useful to consider what happens when an untreated coking coal is carbonised. As the coal is heated above 100°C. some carbon dioxide, carbon monoxide, and water are evolved, but no physical change takes place until a temperature between 300° and 400°C. is reached. At some point in this range, distillation of the liquid products begins to take place. The so-called plastic layer is formed and distillation continues until most of the tar is removed at about 500°C. The mass resolidifies, and as its temperature rises the rate of gas evolution increases and the amount of hydrogen evolved relative to other gases increases as the temperature is raised still further. When a temperature of approximately 700°C. is reached, the coke normally begins to shrink, and this continues until at about 850°C. the volatile matter will be less than 1%.

In National Fuels terminology, the temperature range 350° to 500°C. is the 'critical range' because it includes the plastic range of practically all coals; and the production of non-swollen and unfused coke briquettes depends on the care with which the briquettes are raised in temperature through this critical range. A strongly caking untreated coal, if made into briquettes without binder, could be brought through this temperature range without softening by heating to within a few degrees of its fusion temperature and holding that temperature for a period. The briquettes would therefore retain their rigidity until successive and carefully controlled temperature increases, always kept below the fusion point, had progressively distilled off all the volatile products. Once this point had been reached, the heating rate could be increased and the briquettes could then not soften. The same object could be achieved by heating the briquettes through the critical range at a slow rate of temperature rise, say 0.1°C. per min. This would be a very delicate and time-consuming procedure, so commercially a method is required which provides sufficient fusion of the coal particles to cause agglomeration without either excessive softening or swelling at high rates of temperature rise.

The oxidation of the coal, the use of a suitable binder, and the control of the rate and manner of heating of the briquettes as they pass through the retort, are fundamental in the N.F.C. process.

Controlled retort heating is achieved by providing a proper ratio of gas to briquette flow, so that a plot of temperature against distance between the two points (the limits of the critical range) is a straight line. Assuming that the 500°C. point is 6 ft, below the top of the retort and that the optimum rate of heating through the critical range is obtained when this is so, if the 500°C. point is allowed to rise above this level the rate of heating of the briquettes will increase and they will swell. Alternatively, if the 500°C. point is allowed to drop lower down the retort, the rate of temperature rise will decrease and the higher load of briquettes which will be superimposed upon those passing through the critical range may cause deformation. However, the use of the controlled-oxidation process allows for a considerable tolerance in operation, and this control is not highly critical.

Appraisal of the National Fuels Process

It is possible to assess the advantages and disadvantages of the National Fuels Process in a general way, as follows:—

(1) The main attraction of the process is that by pre-oxidation, briquetting, and subsequent carbonising of the coal, a much wider range of coals can be processed than is possible in standard coke ovens. In particular, the process is specially applicable to weakly caking coals, of which there are very large reserves in countries where good coking coals are scarce. Either single coals or blends can be processed.

(2) The product is of great mechanical strength and is uniform in size, two matters of considerable importance in blast-furnace and gas-generator operation. The briquettes can be varied in size and bulk density; furthermore, as the finishing temperature can be varied between 600° and 900°C. or higher, the residual volatile matter can be adjusted to suit either the industrial or the domestic market. The resistance of the briquette to breakage reduces the proportion of splits and fines to negligible proportions.

(3) The retorts are flexible in operation in that they can be shut down, started up, or held in a standby condition at will and without damage. A wide variation in load should also be possible. This flexibility is of value when repairs are being effected or when a varying gas load has to be met.

(4) The continuous operation of the retort and the inclusion of a dry-quenching section undoubtedly eliminate the unpleasant operations of charging, discharging, and quenching necessary in coke oven plant. While no operating figures are available, it would appear that the re-use of the heat in the quench gas for carbonising and the preliminary heating of the raw briquettes with hot distillation gases should result in a decidedly lower heat consumption.

(5) Although the fuel may not be sufficiently reactive for the ordinary British shallow-bed open fire, it would

bur satisfactorily in the modern deep-bed insulated ope fireplaces which are now becoming more common.

(6) A comparison of the yields of products from the N.F C. process and a typical coke oven plant, coking a

TABLE 1.—PRODUCT YIELDS

	Yield per ton of dry charge	
	Coke oven plant	National Fuels plant (92% coal in the charge)
Volatile in coal, %	36	35
Coke, cwt.	14.4	12.7
Gas C.V., B.Th.U. per cu. ft. at S.T.P. (gross)	525	485
Total volume, cu. ft. (S.T.P.)	12,700	8,300
Volume for underfiring, cu. ft.	4,800	—
Volume for underfiring, drying, oxidation, steam raising, air and gas preheating, cu. ft.	—	2,900
Surplus gas, cu. ft.	7,900	5,400
Tar, gal.	10.5	34.1
Ammonia, lb.	7.62	4.42
Benzole, gal.	4.25	ca. 1

coal of approximately the same volatile content, is given in Table 1. It will be seen that a smaller yield of gas is obtained owing to the high yield of tar which is produced; but this tar, which is of a primary nature, will have a high tar-acid content and command a good price. About two-thirds of the quantity of ammonia will be produced in comparison with the coke oven plant and there will be little benzole and no naphthalene. The thermal efficiency of the process is higher than that of a coke oven plant. The calorific value of 485 B.Th.U. per cu.ft. is achieved by preheating the air and heating gas. If preheating is not carried out a correspondingly larger quantity of gas having a calorific value of 325 B.Th.U. per cu.ft. is obtained.

(7) Pulverising, drying, oxidising, and briquetting are complex and somewhat expensive operations, but this is offset economically by the lower initial cost of the plant as a whole.

(8) As larger-scale plants of this kind have not yet been built, capital costs are difficult to assess accurately. The National Fuels Corporation, however, claim that on the basis of American rates and prices, plant of their design would cost 30 to 40% less than the capital cost of a coke oven plant of equal output. If this is correct (and there appears to be reason to believe that there would be some saving), it is a major point in favour of the process.

(To be continued)

NEW ERA IN GAS MANUFACTURE

DR. OLDEN REFERS TO STAFFORD PLANT

'A NEW ERA in Gas Manufacture and Distribution,' was the title of a paper delivered by Dr. M. J. F. Olden, Deputy Engineer and Manager, Stafford District, West Midlands Gas Board, to the Stafford Chemical Society on January 4. In his paper, the author outlined the development of the gas industry up to vesting day, and described the various conventional methods by which town gas is manufactured.

Dr. Olden emphasised the serious depletion of coking coal reserves, and explained how nationalisation has enabled the gas industry to plan for the future and to co-ordinate efforts in devising other methods of gas manufacture, which would enable non-caking and non-coking coals to be utilised. Details of the Lurgi and 'Integralgas' systems of complete gasification were given, and the possible adoption of these methods by the gas industry was outlined.

If the Government evolves a firm policy on smoke abatement, the call for increased coke production may well outstrip the present potential of the industry, and in the national interest efforts should be made to provide peak load gas from raw materials other than coke. Apart from any economic implications, this renders the installation of an ONIA-GEGI catalytic oil cracking plant at Stafford an event of great importance. In describing the process, the author enumerated the similarity between oil gas and coal gas, and stated that if the installation at Stafford proved to be a real success, both from a gas engineering and an economic viewpoint, it is likely that the process will be widely adopted as a peak load and standby plant. Other oil gas patents were also mentioned, and the development of the Segas catalytic oil cracking process was described. Other new sources of town gas were dealt with by the author, in particular butane/air mixtures for small isolated districts, and methane drainage from coal seams. Although the latter source is of great interest to the gas industry, Dr. Olden felt that, as the supplies available were not large, and almost certainly of limited duration, the utilisation of this methane for town gas could only be regarded as a minor contribution to the future of the nation's gas needs, and that unless large reserves of natural gas are discovered the aim in the future must of necessity be new methods of manufacture.

In distribution, Dr. Olden gave a résumé of the work being carried out to improve supplies. One of the major schemes today involved the creation of gas grids, and the author illustrated this point by reference to the integration that has taken place in North Staffordshire since 1949. These interlinks between undertakings, although important in themselves, are not the final answer to the problem of load spreading and elimination of excess standby plant. For a really efficient system it is not sufficient to create local grids, and Dr. Olden suggested that in the near future the distribution section of the industry would have to consider seriously a national grid involving a planned scheme of high pressure trunk mains. For expansion in gas sales it is essential that, wherever new townships or industrial centres are built, the gas boards should be able to offer an immediate service. To build new plant takes time; with a national gas grid it would often be comparatively easy to bring immediately into action idle plant in areas where a trade recession has taken place or excess plant at the more fortunately placed undertakings, and thereby meet new demands with a minimum delay. The cost of such a scheme would be high, but may well be balanced out by the full utilisation of existing plant and consequent lowering of expenditure on additional gas manufacturing capacity.

NEW BRITISH STANDARDS

THE revised edition of B.S. 458, 'Xyloles' (previous edition, 1939), completes the series of revisions of the four British Standards for benzoles and allied products, the other three (B.S. 135, 'Benzoles,' B.S. 479, 'Coal-tar Naphthas,' and B.S. 805, 'Toluoles') having been published in April this year.

As before, the 'Standard Specifications for Benzole and Allied Products' (1950 edition), published by the National Benzole Association, have been used as a basis for the specifications of the nine grades of xylole. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1 (price 7s. 6d.).

A new British standard has been published relating to three types of tube fittings for engineering purposes of sizes ranging from ⅛ in. to 1 in. inclusive, for use in conjunction with copper, copper alloy, and other suitable tubing, viz.:—

(*a*) Capillary fittings in which the joint is made by the flow of solder by capillarity along the annular space between the outside of the tube and the inside of the socket of the fitting, the size of this annular space being dimensionally accurate within close limits.

(*b*) Compression fittings, Type 'A,' in which the joint is made by the compression of a ring or sleeve or part of the fitting, on to the outside wall of the tube.

(*c*) Compression fittings, Type 'B,' in which the joint is made by the compression of a manipulated portion of the tube at or near its end against true faces of the body of the fitting or against a loose ring or sleeve within the fitting.

This standard does not attempt the complete dimensional standardisation of any of the types of fittings, since the variety in the designs and methods of production already established by the various manufacturers makes any such attempt impracticable. Without seeking to limit the individual refinements of design, which are the distinctive feature of the proprietary product, this standard does, however, lay down such dimensions and requirements as are essential to ensure satisfactory installation and performance.

The fittings covered by the standard are for use with tubes designated by their outside diameters in inches and fractions of an inch.

Copies of this standard (B.S. 2051, Pt. 1, 1953), and another revised standard (B.S. 864, 1953), superseding the 1945 edition, relating to fittings of nominal sizes ranging from ⅛ in. to 2½ in., are also available from the British Standards Institution, price 3s. and 4s. respectively.

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FULL STEAM AT BOW COMMON

A PAPER TO THE LONDON AND SOUTHERN SECTION, OF THE INSTITUTION OF GAS ENGINEERS, JANUARY 19, 1954, BY

A. F. GRANT,

B.Sc.(Eng.), A.K.C., A.M.I.C.E., M.Inst.Gas E., M.Inst.F., Station Engineer, Bow Common Works, North Thames Gas Board

This paper deals with some current problems at the Bow Common works of the North Thames Gas Board, and it may be regarded as a further one in the series of 'works papers' commenced by Mr. H. W. Moys[1] and followed by Mr. D. C. Bertram.[2]

Papers of this kind have always proved of particular interest to a large section of our members, due probably to the fact that the practical rather than the scientific approach to the problems dealt with enables other engineers to consider them in relation to their own works. All engineers in charge of works usually have two distinct aspects of their job which run concurrently:

(a) The day-to-day control of operating results and works administration.

(b) The planning of longer-term schemes for the improvement of efficiency and the economics of gas production.

It is with the latter that I am concerned in this paper and by 'longer-term schemes' a major development programme is not envisaged. No works can be regarded as static at any period even without major reorganisation. Plant replacements due to age or obsolescence, together with minor modifications, require of the engineer a forward planning to ensure sound development and progress towards greater efficiency.

The general emphasis at the 1953 annual general meeting of the Institution was on the need to effect every economy in the production, distribution, and sale of gas to offset rising basic costs and to maintain the competitive position of the industry. To the works engineer the problem presents itself nearly always thus:—

'I have a works comprising some old and some more modern plant. It is the result of gradual development over many years, and because of the long life of most gasworks plant, scrapping of the older units is not justified, although it may not represent a combination resulting in minimum operating costs. My gas-making units have been in operation for a considerable time and experience has shown the conditions necessary for optimum results. There is therefore little scope for improved efficiency here. What therefore can be done with my ancillary plant?'

That, also, is the starting point of this paper and the layout of the Bow Common works fits into this picture. With its one carbonising unit and small C.W.G. plant it is representative of many works up and down the country, although their gas-making capacities may vary widely. In considering improvements in ancillary plant it became clear that considerable scope lay in the investigation of steam and power problems. This, too, will no doubt be the case in many other works.

General Outline of Works Plant

All coal intake is railborne to high-level sidings and unloaded by wagon tippler for direct feed to the retort house or by crane for stocking. From the tippler hopper the coal feeds by gravity and tray feeders to the crushers, thence to bucket elevators and on to gravity bucket conveyors. Coal reclaimed from stock is fed by the crane to a conveyor and into the tippler hopper.

The carbonising unit comprises two benches each of 34 82-in. W.D. continuous vertical retorts carbonising mixed Yorkshire and Derbyshire coals at a throughput of 9.1 tons per retort per day and producing an average of 8 mill. cu.ft. per day of 515 B.Th.U. gas. Attention has been paid to the insulation of the main walls, and secondary air is preheated in steel ducts at floor joist level. With the combustion chamber temperatures normally operated, the waste gas temperature at inlet to boilers is 840°C. The waste gases from each bench are fed into a standard type boiler with one boiler as standby and capable of taking the gases from either bench. Under these conditions each boiler generates 10,500 lb. per hour of steam at a pressure of 110 lb. per sq. in.

Two gravity bucket conveyors encircling the benches provide coaling and coke extraction facilities. Coke is fed from these by belt to an adjacent grading plant, comprising one screening conveyor with belts feeding storage hoppers for both road and rail delivery.

Processing Plant

The gas from the two benches is fed to an atmospheric condenser and vertical tube condensers operated in parallel but not sectionally for each bench. The gas streams unite at the inlet of normal four-bladed steam-engine driven exhausters and the gas is then fed without secondary condensation to Livesey tar extractors, rotary ammonia washers, and oxide purifiers. The latter comprise two sets of overhead concrete boxes dealing with 5.5 mill. cu.ft. per day and three small ground level sets dealing with a total of 2.5 mill. cu.ft. per day. These will shortly be replaced by an installation of tower box purifiers. Benzole extraction and gas drying are practised. Due to the pressure thrown by the four-lift spiral-guided holders, it is necessary to boost all gas into holder, for which an electrically-driven centrifugal booster is installed.

The C.W.G. plant comprises two conventional hand-operated sets each producing 1.2 mill. cu.ft. per day with electrically-driven air blowers. Gas is passed to an atmospheric condenser, four-bladed steam-engine driven exhausters, electrostatic tar extractor, and ground level purifiers, combining with coal gas at inlet to the holder booster.

From outlet holders the gas is fed after drying to a local low pressure distribution system and by steam-driven bladed-exhauster type boosters into the high pressure trunk mains system. These are in process of replacement by electrically-driven Roots blower units. In winter, with a total make of 10 mill. cu.ft. per day, between 3 and 4 mill. cu.ft. are pumped into the H.P. main and, in addition to the consumption on our own low pressure system, a further 1 to 2 mill. cu.ft. are fed into a neighbouring low pressure district. If this latter consumption ceased, therefore, the output on our H.P. system would increase to some 5 mill. cu.ft.

Boiler and Power Plant

(a) *Boilers.*—As indicated, base load steam is provided by the two waste heat boilers on the retort installation with one boiler as a standby which is normally kept ready for use cold.

Each boiler is a 9 ft. 6 in. dia. x 28 ft. long horizontal fire-tube unit generating at a pressure of 110 lb. per sq. in. with superheater capacity to give a steam temperature of 460°F. The induced draught fan is driven by a steam turbine of 40 H.P., the unit being mounted on top of the boiler. The boilers could generate at 130 lb. per sq. in. but, since the direct fired boilers are restricted to 110 lb. per sq. in., this pressure is retained throughout the system.

On the normal full gas output of 4 mill. cu.ft. per day for each bench with a coal consumption of 290 tons per day the producer fuel is 10% and results in an evaporation from each boiler of 10,500 lb. per hour. It will be

1. 'Plant Improvements on a Medium Size Gasworks.' London and Southern Section, January 24, 1950.
2. 'Post-War Developments at the Southall works of the North Thames Gas Board. London and Southern Section, April 15, 1952.

evident later that this level of waste heat steam production is considerably more than a normal base load requirement and creates the particular problems discussed in this paper.

These waste heat boilers have therefore taken over, in the course of works reconstruction, the base load duty of the earlier installation of direct fired boilers—a range of four Lancashires in one setting. These are breeze fired by hand on Wilton grates with the use of coke for abnormal demands of direct fired steam. Superheaters are fitted to two of the boilers.

With the progressive electrification of works plant the demand on these boilers has become very small in total but also very variable to meet the peak requirements. The efficiency of fuel usage is therefore poor; nevertheless it is necessary to keep the boilers under fire to raise additional steam at short notice in the event of failure of a waste heat boiler.

When carburetted water gas is being made the waste heat boiler on each of the two sets generates 950 lb. per hour, which is fed into the main steam distribution system. These boilers are of the standard vertical tube (2⅜ in. bore) type fitted to hand-operated sets.

(b) *Electric Generators.*—Two 300 kW generators are installed powered by two-cylinder vertical steam engines running at 375 R.P.M., the generators being direct coupled. It is the practice to run one set only with the second as standby. The engine is run condensing. The power generated is 430 volts, 3 phase, 50 cycles.

Again, with the development of electrification, the capacity of one generator became inadequate and in 1950 a 100 kW supply was taken in from the London Electricity Board. This additional supply has been used independently of our own generator to feed primarily the demand of the coal handling and coke grading plants though these can be fed alternatively with internally generated power when required. There is therefore some control over the total demand from the L.E.B. but little control over the maximum demand.

At the time of the introduction of the L.E.B. supply future development was envisaged, and an agreement was made therefore to take in up to a nominal 300 kW supply to operate in parallel with internal generation. This provides the necessary standby capacity to our own generators and could enable the feeding back of surplus power to the L.E.B. at off-peak periods.

Steam and Power Demand

The following is a schedule of the larger steam and power users:—

(a) *Steam.*	lb. per hour.
Retort house process steam	6,000
Coal gas exhausters (8 mill. cu.ft. per day gas make)	3,000
Electricity generation	3,500-9,000
Hydraulic engine (coal unloading crane)	3,250
*Waste heat boiler I.D. fan turbines	2,200
H.P. gas pumping	2,000-3,500
C.W.G. production (2.2 mill. cu. ft. per day)	4,400

*These turbines exhaust into the L.P. retort steam system.

(b) *Electricity.*	kW.
Coal handling plant	50
Retort house	36-50
Coke handling plant	23
Coke dry cleaning plant	40
C.W.G. plant	33
Oxide handling plant	33
Holder booster	27
Power for shops	25-50
Benzole and Dri-gas plants	20
H.P. gas distribution (new plant)	35-75

It will be appreciated that the loads indicated in the foregoing are both variable and intermittent, and only a detailed 24-hour analysis of the steam and power demand can give a true picture of works requirements. A careful study of these daily variations under both summer and winter conditions is necessary when assessing the economics of steam and power production in relation, for example, to the electrification of further items of plant or to the intake of outside power supplies. With base load steam generation by waste heat at a high level these economics are vitally affected and the balance between steam production and power demand is of particular importance. It is not impossible to reach a condition, particularly on summer night loads, when steam demand for all purposes is less than the output of the waste heat boilers. This situation is more likely to occur where the works is regarded as a base load unit on practically full coal gas production throughout the summer.

To achieve the required balance the use of pass-out turbines providing low pressure process steam has been advocated. While this is sound for the given set of circumstances, in many works it will not be found possible to utilise all the process steam thereby made available.

Steam and Power Analysis

These interdependent factors will be more clearly evident if the results be given of an analysis of the present situation at Bow Common. The degree of accuracy of this analysis is somewhat limited since, for its compilation, extensive records covering hourly (and sometimes quarter-hourly) readings of steam and power production and utilisation under both summer and winter conditions would be necessary. Staff resources have not been available for this but, by a combination of known daily loads and theoretical considerations, the results are reliable to a degree which does not invalidate the soundness of the conclusions reached. A further point is that extensive metering would be necessary for complete accuracy which is not justified for normal works control.

[*Here, attention is directed to the folding plate of graphs interleaved between pp. 160 and 161.*]

(a) *Basic Steam Demand.*—Graph I is an analysis of the 24-hour steam demand on a winter's day and represents the potential maximum demand that can be anticipated and for which boiler plant must be installed. It is derived from the summation of individual loads, many of them requiring to be estimated, but the summation of these loads has been related to the known levels of steam production under these local conditions. Some allowance must be made for diversity and variations of loads throughout the day, but the chart is of value as a starting-point for providing basic data. For example, it does not follow that the gas pumping load will remain constant, since this is dependent on holder stocks and rate of production, or that it will be necessary to use the hydraulic engine for powering the coal crane for reclaiming from stock on the maximum day.

The steam for power generation is derived from the steam equivalent of the 24-hour power demand, which has been analysed in the same way as is illustrated in Graph 2.

(*b*) *Basic Power Demand.*—Graph 2 has been built up in the same way as Graph 1 from records of 'running amps' for the groups of power users shown. The coke plant and retort house loads, though shown as a series of two-hourly humps, are in fact more in the nature of a number of rectangles, since practically the whole of the load in each case is applied when the G.B. conveyors and coke grading plant are started up at the commencement of each coke extraction, which lasts some 80 min. in each 2 hours. During the day, however, the G.B. conveyor will be run continuously for coaling the retort house.

The particular value of a basic power chart of this kind is that, apart from knowing the potential maximum demands during the day, the impact of individual loads is immediately obvious. Consideration can then be given to the possibility of staggering loads to effect economy. This is especially important where an external source of power is used, which, generally speaking, will be required to take the peak demands when cheap steam is available for the maintenance of a high level of internal generation.

An interesting example is the compressed air load occasioned by the use of compressors for well-pumping by air lift and for driving pneumatic tools for purifier discharging. Since this graph was prepared the air lift has been displaced by a submersible pump and a por able

air compressor purchased for the intermittent requirements of the purifiers. The old belt-driven reciprocating compressors have been scrapped.

(*c*) *Annual Steam Demand.*—Having obtained a picture of the maximum daily steam and power consumption, it is necessary to consider the manner in which these vary between summer and winter conditions. For this purpose Graph 3 has been prepared showing the steam demand. The curves in this case represent more average conditions than those shown for the potential maximum conditions in Graph 1. The 'present normal winter demand' agrees with normal daily steam production, and similarly in the case of the 'present normal summer demand.' The latter represents conditions with no C.W.G. production and a reduction in coal gas make from 8 to 7.6 mill. cu.ft. per day. Apart from the deduction of steam for C.W.G. production, there are reductions in other loads—*e.g.*, gas pumping, anti-freezing, steam heating, etc.—which combine to produce the lower daily demand curve.

The demand for direct-fired steam is indicated for both summer and winter as the area above the appropriate level of waste heat steam production.

Effect of Retort Repairs

Although this analysis is based primarily on full coal gas production throughout the year as a base load carbonising unit, it may be noted that in years when one retort bench is down for re-setting or repair the loss of waste heat steam production is 10,500 lb. per hour, against which the drop in demand will be roughly:

Retorts and producers ..	3,000	lb. per hour.
Exhausting	1,500	„ „
Gas pumping	2,000	„ „
Power (steam equivalent), say	1,000	„ „
Total	7,500	„ „

There will in these circumstances be an additional demand from the direct fired boilers of some 3,000 lb. per hour.

The modified curves 'after electrification' show the effect on steam demand of schemes for the further electrification of plant. Since the present level of power demand during the day period is such that one generator is fully loaded, these additional loads will have to be supplied largely by the external power, and therefore there is not the steam required for a higher level of power generation to offset against the loss of the steam demand of the units electrified.

From Graph 3 and a consideration of the monthly variation in loads, including the normal demand for C.W.G. production from the works, Graph 4 has been developed. On one chart, representing existing conditions, the level of base load steam demand is indicated, and this includes the whole of the steam load with the exception of steam for power generation and for C.W.G. production. While the power generation is a base load, its exclusion enables the chart to show the manner in which steam is provided for this purpose.

The area between the dotted line and the 'total demand' line represents steam for C.W.G. production. Being regarded as a peak load it is assumed that this steam is supplied from direct fired sources. The area between the dotted line and the base load line shows, therefore, the steam required for power generation and, having shown the level of retort house waste heat steam production, the proportions of direct fired and waste heat steam used for this purpose are indicated. From an assessment of costs of each means of steam production the cost of steam for power generation can be established. This is particularly useful when considering the cost of internal power in relation to that of purchased external power.

The chart on the left of the graph, developed on the same lines, illustrates the effect of further electrification and the impact of this on the proportion of waste heat steam available for power generation. It indicates, too, the surplus waste heat steam available during the summer months which could be used for power generation for the additional loads resulting from further electrification if the capacity of installed generating plant were increased. The 'Standby D.F. Steam at 2,000 lb. per hour' is represented as the minimum output on two Lancashire boilers under fire. With C.W.G. tar firing this could be reduced to some 1,000 lb. per hour.

(*d*) *Annual Power Demand.*—This has not been developed graphically since, under base load operating conditions, the daily or monthly demand is relatively constant throughout the year with the exception of the C.W.G. power load in the winter months. Reference has been made, however, to further electrification, and this includes schemes which are already in course of construction. Graph 5 has been prepared to indicate the effect of these new power loads on the existing daily load characteristic. In this chart the areas marked A and B combined represent the existing loads which were analysed in Graph 2.

A typical maximum winter's day load on the internal generator is shown by the dotted line plotted from hourly ammeter readings. Its general agreement with the estimated level of demand is good, bearing in mind that no diversity factor was allowed in plotting the estimated level. In particular the divergence during the day period is due to the number of day loads which have intermittent characteristics—*e.g.*, rail wagon tippler and oxide handling plant. During the night period it would appear that an adequate allowance has been made for the lighting load and a number of minor consumers.

The estimated loads of future plant have been superimposed, the chief one being the replacement of the existing steam driven high pressure gas pumps by an electrically-driven unit of 100 H.P. The new electrically-driven tar and liquor pumps replace steam units for pumping tar to a barge-loading point away from the works and liquor to the products works at Beckton. The load imposed by the new tower purifier installation is very much an estimate and is drawn to show the peak effect of the 40-H.P. motor on the crane, lifting trays, and the 5-H.P. motor on the rotary tray tippler.

The worsening effect of these new loads on the daily load factor is evident, and this is an important consideration, particularly when part-external power is used which may have to take the peaks and so increase the overall cost per unit purchased due to high standing charges and maximum penalties.

The full load output of the generator is indicated on the chart, from which it will be noted that additional power could be generated at night at times when there is also the maximum availability of waste heat steam for this purpose.

Economics of Production and Utilisation

A picture has now been built up of the steam and power requirements for the works, and the inter-relation between the two has been illustrated. From these data, combined with a knowledge of production costs, the economics of proposed future developments can be assessed.

First, the steam production aspect. Clearly, in any future circumstances, the Lancashire boilers will be the peak load steam raising plants, but in addition to this duty they may be called upon at short notice to make good the loss of 10,500 lb. per hour production capacity if a waste heat boiler failure occurs. This represents some 40% of the average day demand for steam; and this leads to the query whether, at some future appropriate date, it would be desirable to install two waste heat boilers of half the present capacity on each bench with one common standby. Alternatively, standby fan driving units on each of the existing boilers would provide a greater safeguard to present conditions.

The peak load operation of the Lancashire boilers, with hand firing of low grade coke/breeze fuel, is uneconomical. Moreover, the installation of mechanical grates would be unlikely to provide the degree of flexibility of steam output particularly with the long periods on very low demand when, indeed, one boiler at least could be shut down. There is a preference, therefore, for C.W.G. tar firing; and it would appear that two boilers so equipped would provide adequate steaming capacity to meet all needs. However, it is probable that, for considerable periods, only one boiler with the burners set at the minimum rate of firing would be required. But the heat must

be retained in the second boiler setting to keep this boiler in a condition to raise steam in the shortest time. This requires alternate firing of each boiler for, say, four-hourly periods, and the provision of effective dampers to retain the heat in the idle boiler setting. Proposals on these lines are now being implemented, and a new type of damper gear is to be tried.

The principles underlying the choice of liquid fuel for burning on simple shell type boilers acting as peak load steam raising plant were dealt with fully in the paper to the Institution of Gas Engineers in 1951 by Dr. J. Burns, 'Some Aspects of Gas Manufacture Practice in the North Thames Gas Board Area.'

The economics in this conversion to liquid fuel may be summarised as follows:—

One boilerman per shift will be saved over the existing hand-firing, representing an annual sum of £1,800. Comparative unit costs are:—

	Present Hand-Firing Coke/Breeze s./unit.	C.W.G. Tar Firing s./unit.
Attendance	14.6	7.3
Fuel	61.6	50.0
Water	1.9	1.9
Power	—	1.0
Maintenance and renewals	10.2	10.6
Total	88.3	70.8

In regard to steam consumption the waste heat boiler fan turbines exhaust at 10-15 lb. per sq. in. into the ring steam main feeding the retorts. This provides some 2,200 lb. per hour against a total requirement of approximately 2,600 lb. per hour, the balance being made up with live steam. In the same way the turbine driving the pumps on the benzole plant supplies the greater part of the process demand for steam of 1,500 lb. per hour on normal rates of extraction. Steam is fed to the retort house producers from the H.P. main through reducing valves at 45 lb. per sq. in. It would be possible, of course, to design the venturi air injectors on the producers to use steam at 15 lb. per sq. in., but in this connection there is a tendency to replace these injectors by a saturated air-blast system which reduces the steam demand.

It is true that steam at low pressure could be used by other consumers—*e.g.*, lobbies, office heating, and, in winter, anti-freezing. But, in view of the overall demand and the peak winter nature of the demand, it is doubtful whether any advantage is to be gained by the installation of a mixed pass-out and condensing turbine as the prime mover for the power generator with sufficiently variable characteristics to supply these peak demands. The installation of such a turbine would imply a re-arrangement of the existing low pressure steam system, though this consideration is less important than the policy to be adopted for power generation and the utilisation of available waste heat steam.

The Question of Costs

While for comparative purposes it can be argued that waste heat steam produced in the retort house, and surplus to carbonising requirements, can be charged to other consumers at direct-fired cost of production, and the balance between this rate and the actual cost of waste heat steam raising credited to retort house costs of gas production, the steam and power costs thereby produced do not present the correct basis when considering economics within the works concerned. Cost figures in this paper relate therefore to the actual costs of production from each source, excluding capital charges.

The present cost of waste heat steam generation is 8.2s. per unit and of direct fired steam 88.3s. per unit. The latter rate is high due to the low output and uneconomical method of firing the Lancashire boilers. As has been indicated earlier, this rate can be reduced to 70.8s. per unit by C.W.G. tar firing.

From Graph 4, Existing Conditions, it will be noted that steam for internal power generation is supplied by approximately equal quantities of waste heat and direct fired steam when assuming that C.W.G. production, being peak load, is met by direct fired steam. On this basis, and with the steam costs of 8.2 and 70.8s. per unit, the average annual cost of internal power generation would be 1.75d. per unit including attendance, maintenance, and repair.

For comparison the cost of external power supplied for the load indicated in Graph 5 was also 1.75 per unit (basis 100 kW nominal supply, 90 kW maximum demand, and average hourly demand 34 kW).

Under the future steam availability conditions following electrification, indicated in Graph 4, it will be noted that practically the whole of the generating demand can be supplied by waste heat steam assuming that the new power loads are met by the external power supply. This would result in a lower cost of internal generation of approximately 0.63d. per unit.

A Matter of Balance

The effect of the trend towards increased electrification on the costs of internal generation of power is, therefore, clear, and the desirability of maintaining a high level of internal power production is obvious, but it gives rise to the problems of:—

(*a*) The provision of additional internal generating plant and/or the linking-up with the external supply,

(*b*) The balancing of waste heat steam available with the level of consumption, the predominant factor in achieving this balance being the level of internal power generation.

(*a*) *The External Supply.*

An extension of the present 100 kW. external supply to 300 kW. has been made. This scheme envisages, on a long-term basis, the continued development of works electrification and, potentially, the ability to feed power back into this supply by the works generators at off-peak periods. It is, therefore, proposed to operate the two supplies, external and internal, in parallel on a common set of bus-bars. The initial agreement, however, precludes the feeding-back of power, and this gives rise to certain problems in operation.

On the electrical side, and from an overall cost point of view, it is desirable to maintain the level of internal generation as high as possible, and from practical considerations this can be done even with the slow-running internal generator. The works load characteristics, however, with the sudden imposition of the G.B. conveyor, coke handling plant, and the retort house dust extraction plant, combined with other intermittent loads and their equally sudden cessation, may give rise to difficulties in the acceptance and shedding of these loads in an appropriate proportion by the two power supplies.

The potential danger is that, on shedding the loads, the internal generator may tend to respond sluggishly and to take over the full remaining load, and fail thereby on overload or, alternatively, tend to feed back into the external supply and cut out the latter when again it would have suddenly to take the full load. If this results in the limitation, as a safety precaution, of the level of internal generation, the minimum overall power cost will not be obtained, and full use will not be made of the waste heat available for generation.

The conditions under which parallel running operates will require careful supervision to ensure a reliable system adequate to safeguard continuity of gas production.

An alternative method of control would be to provide change-over switches on each outgoing panel of the main switchboard, each coupled to the internal and external supplies, so that sections of the works could be fed as required by either internal or external power. This would control, to some degree, the level of internal generation throughout the 24 hours. This system requires a duplicate set of bus-bars on the main board—one set powered from the internal generator, and the other from the external source of supply.

With the basic principle that the cheapest total power cost obtains with the highest level of output from our own unit, a glance at Graph 5 will indicate the extent of the peak demand to be supplied by the incoming source.

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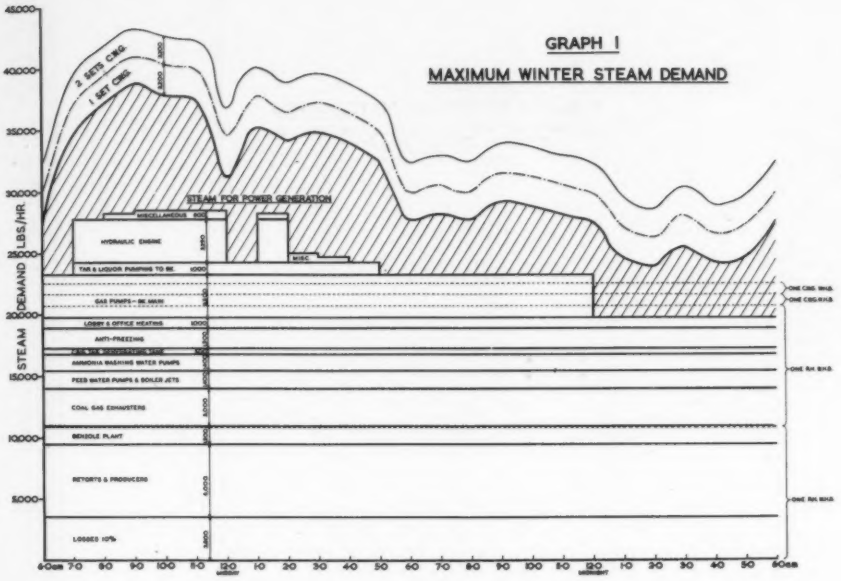
Graphs accompanying
by A. F. Grant to the L
Southern Section
Institution of Gas
January 1954

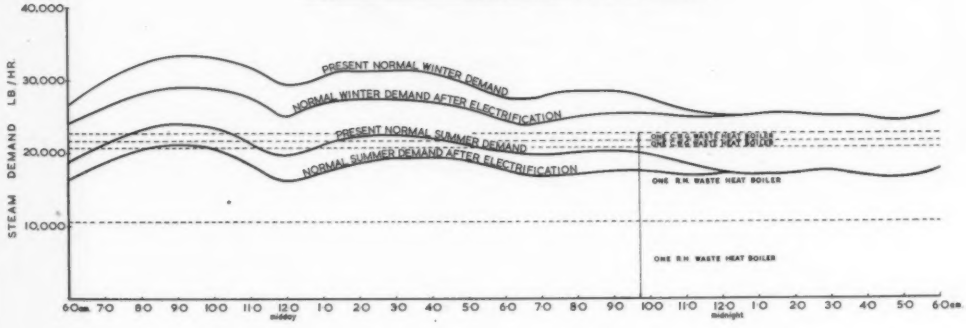
GRAPH 1

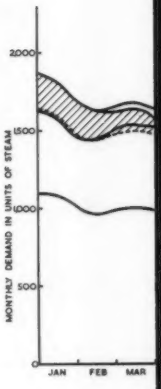
MAXIMUM WINTER STEAM DEMAND



GRAPH 3

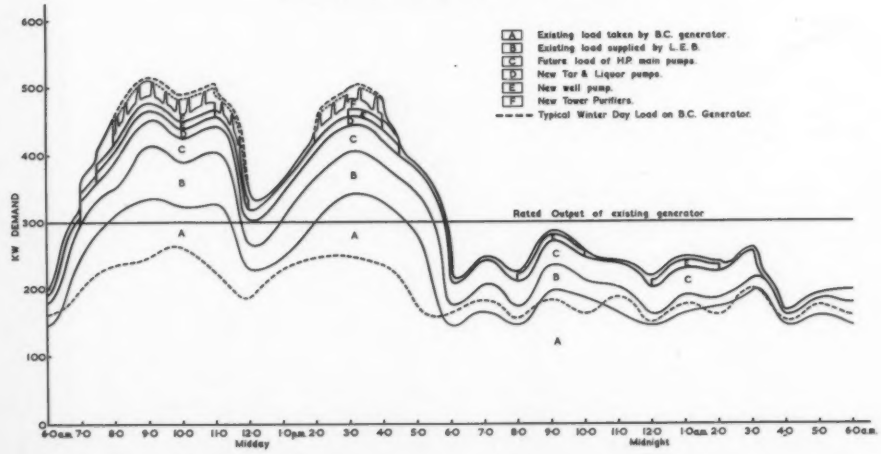
STEAM DEMAND IN SUMMER AND WINTER

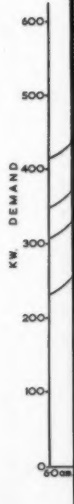

STEAM DEMAND LB/HR
40,000
30,000
20,000
10,000
PRESENT NORMAL WINTER DEMAND
NORMAL WINTER DEMAND AFTER ELECTRIFICATION
PRESENT NORMAL SUMMER DEMAND
NORMAL SUMMER DEMAND AFTER ELECTRIFICATION
ONE R.H. WASTE HEAT BOILER
ONE R.H. WASTE HEAT BOILER
60am 70 80 90 100 110 120 midday 10 20 30 40 50 60 70 80 90 100 110 120 midnight 10 20 30 40 50 60am



GRAPH 5

POWER DEMAND ON MAXIMUM DAY


KW DEMAND
600
500
400
300
200
100
A Existing load taken by B.C. generator.
B Existing load supplied by L.E.B.
C Future load of H.P. main pumps.
D New Tar & Liquor pumps.
E New well pump.
F New Tower Purifiers.
Typical Winter Day Load on B.C. Generator.
Rated Output of existing generator
60a.m. 70 80 90 100 110 120 Midday 10p.m. 20 30 40 50 60 70 80 90 100 110 120 Midnight 10a.m. 20 30 40 50 60a.m.



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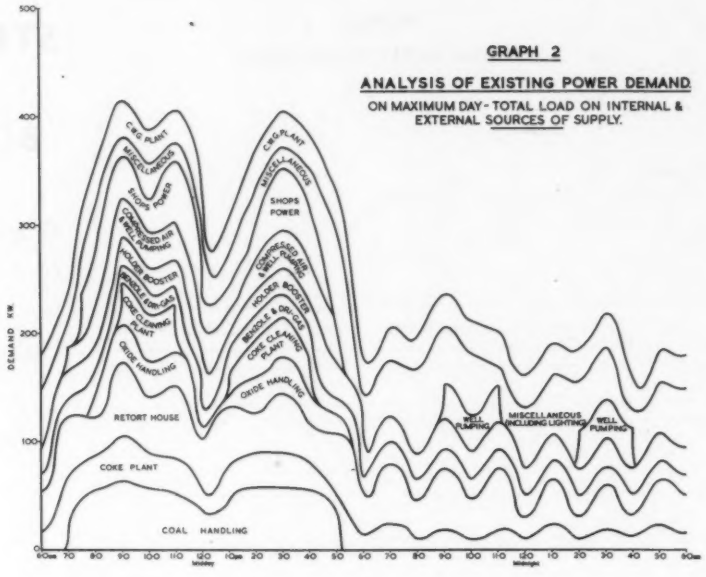
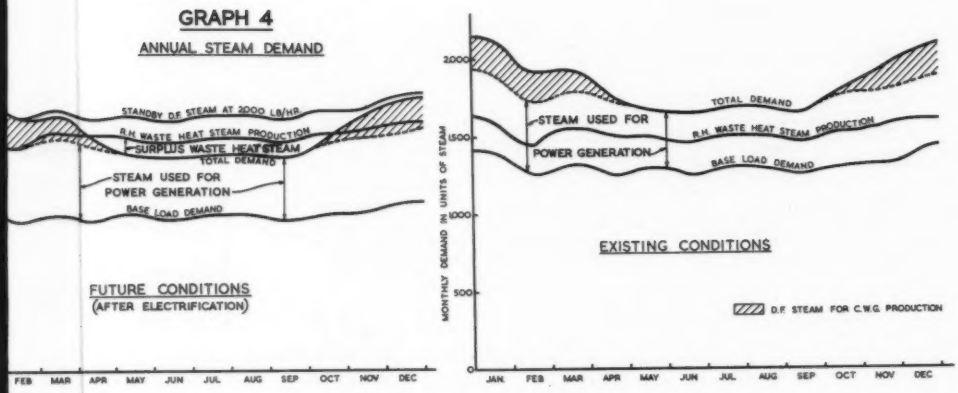
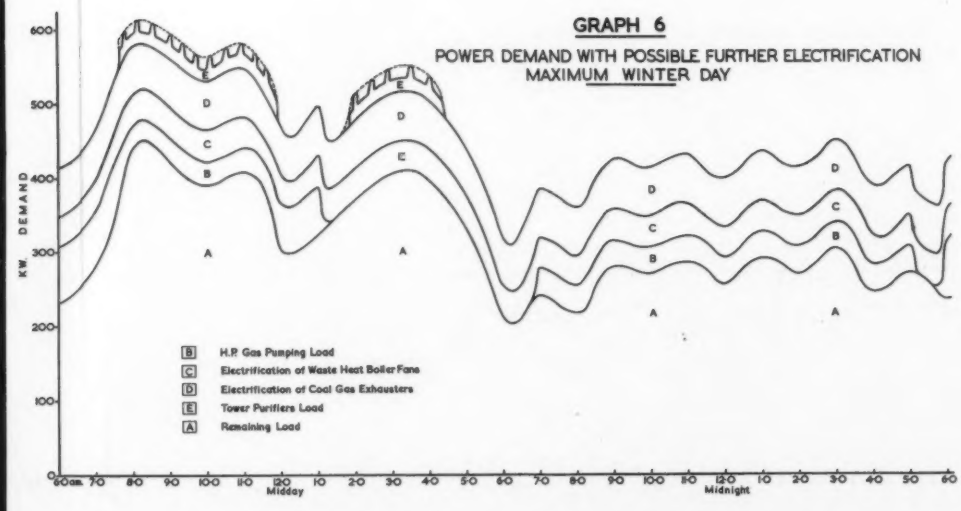



GRAPH 4
ANNUAL STEAM DEMAND
STANDBY D.F. STEAM AT 2000 LB/HR.
R.H. WASTE HEAT STEAM PRODUCTION
SURPLUS WASTE HEAT STEAM
TOTAL DEMAND
STEAM USED FOR POWER GENERATION
BASE LOAD DEMAND
FUTURE CONDITIONS
(AFTER ELECTRIFICATION)
FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTHLY DEMAND IN UNITS OF STEAM
TOTAL DEMAND
STEAM USED FOR POWER GENERATION
R.H. WASTE HEAT STEAM PRODUCTION
BASE LOAD DEMAND
EXISTING CONDITIONS
D.F. STEAM FOR C.W.G. PRODUCTION
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



Clearly this source would not be required at night; and an approximate calculation, allowing for the diversity of the day-time load, gives a cost of the power supplied of 2.08d. per unit.

(*b*) *Balance between Steam and Power.*

The left-hand part of Graph 4 indicates the potential lack of balance by the surplus of steam shown for a considerable part of the year. It must be remembered that this occurs largely at night. From this chart it is calculated that sufficient waste heat steam is available with the minimum output from the tar-fired boilers to maintain a 24 hour level of power generation of some 280 kW.

Turning to Graph 5, it will be noted that the adjustment of the rate of gas pumping, to be a minimum during the day with continuous running at night at the required maximum output, would tend to accommodate this rate of generation. The practical extent of this adjustment of the pumping load depends on a number of factors including holder stocks, rate of consumption on the low pressure district, and the capacity of the high pressure system to take the gas at night when it is feeding into the holders of other works of the Board.

It would be possible, also, to transfer the coke cleaning plant load of some 40 kW. to night operation. The diversity factor to be applied to this 'maximum day' chart must also be borne in mind. The combined effect of these adjustments would have a material bearing on the load factor of the daily demand from the external supply resulting in a significant reduction in cost per unit.

Future Developments

Entry into the realm of prophesy is hazardous. Proposals made today may become unsound in the light of changing conditions. However, some general line of development can be pursued, and the basic principles may need only relatively minor modification to meet new conditions in the future.

The valuable paper by Mr. L. J. Clark to the 5th International Gas Union Conference gave a modernised steam and power system for a works of the size of Bow Common; and I have been fortunate in having access to the data compiled by Mr. Clark in preparing this section of his paper. The flow diagram that he gave may be regarded as a possible 'end-point' to steam and power layout and design; or, alternatively, the ideal system when planning a new works. When developing, however, from the plant on an existing works, variations from the ideal may be more economical.

There is a trend towards complete electrification, but with this is bound up the desirability of being able to export surplus power which involves the installation of equipment and acceptance of the standing charges incurred in parallel operation together with the cost at which surplus power can be sold. While in these circumstances the external source can be regarded as standby generating plant, its use in this capacity must be limited, otherwise excessive service and maximum demand charges will result in a high cost per unit of demand. Moreover, the bulk of the exportable power is available at off-peak periods and its value to the electricity authority is low.

Schemes for complete electrification depend, to some extent, on the existence of a fairly high level of process steam demand which can be met by low pressure pass-out steam if the steam and power system is to be reasonably balanced. This is the case at Swan Village, where the process steam of the old works can be supplied largely by pass-out steam from the new works.[3]

From these generalisations we may return to the particular case of Bow Common. There is already a fair degree of electrification of minor items of plant, and it will be desirable to complete the electrification of all pumps, though steam standby units may be required in some cases. Ammonia washers have recently been converted to electric motor drive inexpensively by the use of geared motors. There is a case also for motorising the wagon hoist used for lifting loaded coke trucks from yard level to viaduct level. Although this is an intermittent load of poor load factor the horse-power involved is insignificant on the total works load. This, at present, is hydraulically operated, and a major saving is also made in the obviation of attendance charges on the pump.

Since full benzole extraction with sulphur recovery is not now normally practised, it is doubtful whether, in view of the existing steam and power balance on the plant, there is anything to be gained by fully electrifying all the pumps.

With the normal unloading of coal by rail tippler, the cranes are used only for movement into and out of stock. Stock variations during the year are relatively small due to the need to maintain to a maximum the already limited stocking capacity. The cranes work intermittently, and for all practical purposes one only is used. There would appear to be no justification for providing an electrically-driven hydraulic engine for powering the crane in place of the existing steam-driven unit, which is admittedly a heavy steam consumer. Electric conversion, however, would impose a load of some 55 kW for a few hours per annum. The installation of generating capacity to meet this load, together with the capital cost of conversion of the pump, makes the proposal of doubtful value; and, at this stage, retention of the steam drive is to be preferred even if the steam has to be produced by the Lancashire boilers. Similar arguments apply to a direct conversion of the cranes to electric operation.

The installation of the tower purifiers enables the abandonment of the small water-luted purifiers, and it will be possible then to dispense with the works booster. This will mean that the exhausters will take over the load at present carried by the booster, and with the holders throwing 16 in. W.G. when fully cupped, the outlet exhauster pressure will be some 50 in. W.G. This will involve an additional overall consumption of steam by the relatively inefficient engines on the exhausters, but electrical failure of the booster can throw a sudden load on the exhausters by the rapid build-up of an additional 12 in. W.G. in gas stream pressures. Also, in present circumstances, the loss of a power load to steam will improve the balance between the two.

This brings us to consideration of the electrification of the major units—*i.e.*:—

(a) Waste heat boiler fans.

(b) Exhausters.

We may study the effect of electrification of these units as two more or less final stages in a development towards practically complete electrification. To illustrate this, Graph 6 has been prepared, which is largely self-explanatory. In the area A the coke cleaning plant load has been transferred to night operation and gas pumping adjusted to a possible programme which minimises the day demand.

The two Roots pumps installed are each of a capacity of 250,000 cu.ft. per hour operating normally on a 45-50 in. W.G. differential. This, however, may increase to 65 in. W.G. resulting in a power increase per pump of 10 kW. The pumps are designed for a maximum differential of 100 in. W.G., which would increase the demand over that shown by 30 kW per pump.

Electrification of Waste Heat Boiler Fans

As the steam from the turbines driving these fans is exhausted into the retort steam low pressure system, the saving in steam by the conversion may be relatively small. If, however, this modification is linked with possible development of the generating plant, a better balanced arrangement may result. It is assumed that an additional back-pressure turbine driven generator of appropriate size is installed and operated in parallel with one of the existing 300 kW generators and with the external supply; further, that the latter is prepared to take any exportable power.

Assuming also that the peak load steam requirements for C.W.G. production (excluding C.W.G. power) and

(*Continued on p. 163*)

[3] 'Some Special Features of the New Swan Village Gasworks,' S. K. Hawthorn' I.G.E. Comm. 424 (1953).

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for the hydraulic engine powering the coaling cranes is met by direct fired steam, we have the following:—

Waste Heat Steam Available for Generation:—

	lb. per hour.	lb. per hour.
Output of waste heat boilers		21,000
Less		
Coal gas exhausters ..	3,000	
Benzole plant	1,500	
Sundries	500	
Losses	500	5,500
Available for generation		15,500

Pass-out Steam for Process:—

	Summer lb. per hour.	Winter lb. per hour.
Retorts and producers ..	6,000	6,000
Lobby and office heating	1,000	1,500
Dri-gas	500	500
Anti-freezing	—	1,500
Losses	800	1,000
	8,300	10,500

Assuming an output level of 280 kW on one existing generator with a steam consumption of 7,300 lb. per hour, and making use of the full waste heat boiler pressure of 130 lb. per sq. in. and steam superheated to 500°F., the new generator turbine could be fed with 8,200 lb. per hour, exhausting the whole of this steam at a back-pressure of 15 lb. per sq. in. The additional process steam demand in winter would have to be met by direct fired steam from the Lancashire boilers which would be under fire. Such a turbine would generate some 160 kW which would provide a total internal capacity of 440 kW. It would be relatively simple in design, requiring no condensing equipment, and could be installed at a reasonable cost.

From Graph 6 an average day load under winter conditions of some 400 kW may be taken, allowing for the diversity factor, and at night some 320 kW. With an 80% annual load factor and a proportion of 130 days on winter conditions and 235 days on summer conditions, the day demand in summer would average 280 kW and at night 230 kW.

On this basis, a simple calculation will show that, annually, some 514,000 units could be exported during the day 12 hours and 780,000 units during the night period. The revenue from this exported power would provide approximately £2,000 annually to set against the capital cost of the installation of the new boiler fans and motors, turbo-generator, and any additional ring main feeders and relay equipment required to ensure a reliable power supply to the waste heat boiler fan motors.

In considering the cost of generating this additional power we are involved in marginal costs. The steam is available at the extra cost of the softened water if full use is made of the waste gases, and, with no additional attendance charges, similarly there would be no extra attendances wages incurred on the new generator, although some extra maintenance may be involved. Adequate data are not available from the many assumptions made in the foregoing to estimate reliable costs of generation under these conditions, but it is not unreasonable to expect that the obtainable revenue would justify generation internally at the level indicated, and the export of surplus power.

Electrification of Coal Gas Exhausters

This may be regarded, perhaps, as the final stage to which electrification could be developed, and it will be noted from Graph 6 that it imposes a further steady power load of some 67 kW. In this case it would be necessary to replace the existing bladed exhausters by, probably, direct-coupled centrifugal fan units with some form of automatic speed control from the motor drive. Three units, each having a capacity of approximately 50% of the normal rate of gas production, are suggested, allowing two to be in operation with one standby. This would cover satisfactorily conditions when one retort bench was down for re-setting.

Waste heat steam available for generation will be increased by 3,000 lb. per hour, the present consumption of the exhausters—*i.e.*, to 18,500 lb. per hour.

The new alternator, to work in parallel with an existing generator and with the outside supply, will require to operate under the following conditions at the turbine:—

	lb. per hour.
Steam input at 130 lb. per sq. in. and 500°F. (18,500-7,300 lb. per hour)	11,200
Pass-out steam Summer	8,300
Winter	10,500

A turbine with these characteristics, if of practicable design, would power the alternator to generate 300 kW in the summer and 220 kW in winter, which would give corresponding total generating capacities of 580 kW and 500 kW.

From the upper curve of Graph 6:—

Winter. Average load 480 kW day 370 kW night.
Summer. Average load 380 kW day 280 kW night.

On this basis some 595,000 units could be exported during the day period and 1,050,000 units at night annually, which would provide a revenue of some £2,900.

In considering these two stages the basic theoretical requirements of each have been dealt with, utilising only the waste heat steam available. In practice the requirements of sound turbine design would have to be met and it would probably be necessary to limit the proportion of pass-out steam to the summer requirement of 8,300 lb. per hour, making up the additional low pressure steam demand in winter by live steam. This would result in an annual increase in exportable power. Moreover, as the direct-fired boilers will require to be maintained at steam-raising condition as an emergency standby, there would be small quantities of steam from these available for generation for export. While this is not economical, it is also unavoidable; and it would be a means of balancing steam production and power generation. On the other hand, in winter, by restricting the export of power, retort house waste heat steam could be used for carburetted water gas production.

The analysis of these potential developments could be extended to assess the net cost of power supplied to the works consumers taking credit for power exported. Indeed, such an analysis would be necessary as a foundation to any projected scheme for further electrification.

This analysis would require to make allowance for conditions during the summer periods when one retort bench is being re-set, and these conditions will have a bearing on the generating plant installed. The paper has been confined to base load operating conditions on the carbonising plant to restrict its length and to avoid complication of the main picture presented. It may be noted briefly, however, that the effect of a 50% cut in coal gas production is the loss of 10,500 lb. per hour of waste heat steam, but the level of power demand will fall only by half the waste heat boiler fan and exhauster loads—*i.e.*, by some 55 kW. Several other loads will apply for short periods—*e.g.*, coal handling and coke plants—so that the daily load curve will have a worsened load factor, and the demand on the direct-fired boilers for steam will not approach a figure equivalent to the loss of waste heat steam. Since process steam will be halved also, the operating characteristics of any new generator turbine will have to cover a wide range.

The developments outlined represent what may be regarded as the layman's straightforward approach to the problem on what seem to be the most economical lines. The author is, however, fully aware that there may be practical difficulties from the standpoint of good electro-technology. These matters involve the satisfactory paralelling of three power supplies with prime movers of very different characteristics, and the apportionment of the load between them. It may be more economical to replace the existing generators by modern turbine-driven units. In this connection the installation of two running units would appear to be desirable, making use of the out-

(*Concluded on p. 165*)

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side source of supply as a standby if one was under repair. This would depend on the cost of taking in emergency power in this way compared with the idle capital cost of providing a third generator as standby. Whatever is installed, the criterion is adequate cover to maintain gas production without major interruption for 24 hours a day, every day.

There are also the problems of exporting power at the low voltage of 415 and its method of utilisation by the electricity authority in the quantities available throughout the day.

Conclusion

This paper was prepared with no preconceived ideas on the steam and power problem as a whole, and it has not been the intention to substantiate a case for complete electrification. While the existing conditions had been studied in some detail, the impact of further possible development has been worked out.

The stages of development considered have been related to existing plant and conditions. They may be summarised briefly as follows:—

(a) *Existing Conditions.*—Steam for power generation made up with approximately equal quantities of waste heat and direct-fired steam. Steam available in this way provides maximum output of some 280 kW at a power cost of 1.75d. per unit. Balance of power demand made up by the external supply at 1.75d. per unit also.

(b) *After Initial Stage of Electrification.*—Reduction in works total steam demand enables a steady level of internal power generation from waste heat steam only, of 280 kW at a cost of 0.63d. per unit. The load factor of the increased demand on the external source is worsened and would result in an increased cost estimated at 2.08d. per unit.

(c) *Additional Electrification of Waste Heat Boiler Fan Drives.*—By making use of pass-out steam for the low pressure process demand, internal generation from waste heat steam could be increased to a level of 440 kW, and some 1.3 mill. units could be exported annually.

(d) *Subsequent Electrification of Coal Gas Exhauster Drives.*—Internal generation increased to 580 kW in summer and 500 kW in winter resulting in the possible export of 1.64 mill. units of surplus power per annum.

Perhaps the key factor which emerges is the important part played by the level of low pressure process steam demand. This exerts a control on the level of power generation possible and therefore tends to control the balance between steam and power. Generally, the process steam demand on most works of the Bow Common type will not be great enough to establish such a balance. More thought may be given with advantage, however, to the creation of additional demands. For example, the economics of operating a liquor concentration plant against this background of steam and power might be worthy of study.

However, a balance could not be achieved in this way at all times. The second means to this end is the possibility of exporting surplus power under reasonable terms. If this is not possible, waste heat must be lost to the atmosphere.

The chief aim is not necessarily to obtain this balance between steam and power, but to utilise them in such a manner as to produce the minimum operating cost. The export of power may have an economic limit short of the level required to create the balance. Nevertheless, there are obvious advantages in an extension of the use of electric power generation and utilisation. In this connection the gas engineer looks for the same reliability from electrical equipment for his vital units as he has obtained from his existing steam drives.

(The discussion will be published in a later issue of the 'JOURNAL')

IMPERIAL COLLEGE OF SCIENCE

THE 'GAS JOURNAL' recorded last year that the annual report for 1951-52 of the Imperial College of Science and Technology showed an accumulated excess of expenditure over income of £19,451, an achievement which had seemed unlikely two years previously. The latest report of the College—for 1952-53—shows that this excess has been still further narrowed to £1,458. In January, 1953, the Treasury announced the intention of the Government to make provision for the major expansion of the College. Since the war there has been a 50% increase in the number of students from about 1,100 to about 1,650, without any appreciable increase in accommodation.

WORLD PEAT CONFERENCE

DELEGATIONS from Britain, Norway, Sweden, Finland, Denmark, Iceland, Holland, Germany, Canada, the United States, France, and Switzerland are expected to attend Ireland's first International Peat Symposium in Dublin from July 12-17. Peat technicians, scientists, and experts from all over the world will submit papers which will be circulated before the Convention and be discussed at meetings. The scope of the discussions will be wide, and the papers to be read include such subjects as open-cycle peat-fired gas turbines, excavating methods, gasification of peat, and domestic uses of peat.

A member of each delegation will submit a paper on general developments in his own country. Outside the Iron Curtain, Ireland is the leading country in the field of peat harvesting and utilisation. Since the war, two large new peat-burning generating stations, the largest of their kind in the world outside Russia, have been built and several others are being constructed.

New Gas Tariffs in Scotland

AN average increase of ¼d. per therm in the price of gas is announced by the Scottish Gas Board. New tariff rates have been worked out for the whole of the country which aim at a uniformity of structure. But under the new block system, which will apply to all undertakings, reduced rates will be given to domestic as well as industrial consumers when they exceed a certain level.

Further reductions will be available for industrial and commercial consumers who reach higher levels, and special arrangements can be made to meet special cases for high consumption. The first block ends at 27 therms per quarter, which is exceeded for all or part of the year by most consumers, so that they will get a lower rate on the rest of their consumption.

A further important concession has been for consumers with prepayment meters. At present they pay in most places an extra charge for every unit consumed of about 1d. per therm, or 4d. per 1,000 cu.ft. This payment will now be limited to the first block, so that there will be a reduction varying from 1s. to 2s. 2d. per 1,000 cu.ft. for them thereafter. Other consumers get the reduced rate at the same stage. In their case the reduction is from 8d. to 1s. 10d.

Making the announcement in Edinburgh, Sir Andrew Clow said that systems of this kind would in any case involve in most places some increases in the rate for the first block, and present conditions had necessitated an increase in average rates. The Scottish Gas Board was the only one which failed to make a profit last year; there had been a working loss of £270,000, to which had to be added a deficit carried forward of £94,000.

'It is necessary,' he commented, 'to ensure a proper balance in future and to pay off the deficits already incurred, and the Board hopes to increase its income under the new tariff by about 3%, or £650,000.' At the same time rates (subject to fixed maxima) were now closely related to the financial positions of undertakings, so that in some there would be large increases, in some smaller and in some reductions.

The places in which there will be general reduction of rates include Buckie, Denny, Falkirk, Gourock, Hawick, Inverness, Kinghorn, Kirkcaldy, Leslie, Lockerbie, Markinch, Neilston, Newport, and West Wemyss. In addition there are 29 places, in which there will be no increase in the initial rate and reductions in all the rates thereafter. In many other places the rates for substantial consumption will be reduced.

The Board has withdrawn concessions, given only in a few places, for prompt payment and has in most cases reduced the extra charge imposed on places at a considerable distance from the gasworks; in some cases it has eliminated this charge.

The estimated increases per therm in the four Scottish cities are as follows:—Edinburgh, 1.17d.; Dundee, 0.62d.; Glasgow, 0.94d.; Aberdeen, 0.64d.

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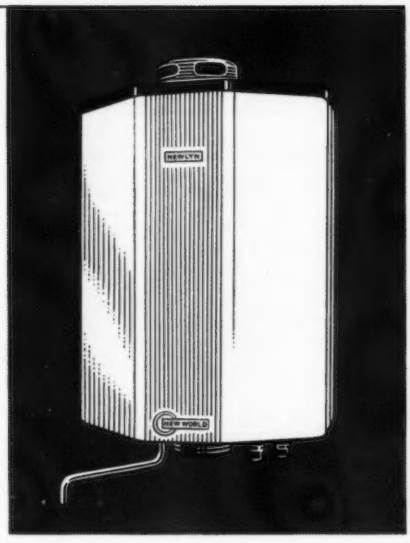

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COKE PUBLICITY COULD BE IMPROVED

THE Christmas meeting of the London and Counties Coke Sales Circle was held at the Holborn Restaurant and was attended by about 50 members, under the Chairmanship of Mr. D. G. Rose, Coke Manager of the North Thames Gas Board. The meeting took the form of discussion groups, each of which was given a few minutes to consider a question of topical interest affecting coke. Each group's appointed leader was then called upon to summarise its views on its particular question, after which the topic was open to general discussion. There was a lively and informative exchange of opinions. Some of the questions and answers were:—

De-Rationing ?

Is there a case for de-rationing coke? There was a concensus of opinion that it would be possible to de-ration supplies of coke in the comparatively near future, but that such a step should not be taken without due regard to the supply position of other solid fuels, notably house coal. Members were agreed on the need to encourage greater consumption of coke by the domestic consumer, particularly having regard to the necessity or reducing atmospheric pollution.

Are smokeless zones practicable? The meeting was in favour of the development of smokeless zones wherever possible and in general considered that the most promising start could be made in comparatively small areas, particularly where new building schemes were in progress. Success, however, could only be achieved by educating the public in the proper use of appliances and of fuel.

Having regard to the continued shortage of coal, what can be done to encourage domestic consumers to use fuel more efficiently? The post-war building programme had created large new housing estates in which modern types of appliances had been installed, and it was felt that such consumers were reasonably well informed as to the use of modern appliances. A good deal of pioneer work had been carried out by suppliers and others in demonstrating the improved appliances, but it was considered essential that the merchant should know what appliance his customer was using, as without that information correct advice could not be given to consumers in regard to the right choice of fuel.

Problem of Conversions

There was a second and more difficult side to the problem, namely, how to encourage tenants living in old buildings, with out-of-date appliances, to convert to the more efficient modern types in view of their understandable reluctance to install an appliance in someone else's property. There was also the question of expense to the owner/occupier. A possible solution might be an extension of hire-purchase arrangements.

It was stressed that it was necessary in all cases that supplies of the right type of fuel for each appliance should be continuous.

Do modern appliances save fuel and/or increase comfort? Members agreed that modern appliances do save fuel and give greater comfort.

It is suggested that coke publicity is poor. What steps should be taken to improve coke publicity? It was considered that coke publicity could be improved, but that it was necessary to exercise restraint, and that any coke publicity should continue to be educational in tone.

Is there any reason why coke should not completely replace anthracite and free additional supplies of the latter fuel for export? In view of the need to export the maximum tonnage of anthracite, it would be advisable to replace as much as possible in the home market with other suitable solid fuels such as coke, and such anthracite as was available should be reserved for the restricted class of appliances which cannot operate successfully on any other fuel.

Is the public today really more coke conscious, or is the increased demand due to the shortage of other fuels? The opinion was expressed that although the use of coke, particularly for domestic consumption, was on the increase, the general public are not as fully coke conscious as the merits of the fuel justify. There was evidence that in many cases coke was still used as a substitute fuel because of the shortage of other solid fuels, rather than on account of its own good points. It was, however, essential to pay close attention to the quality and grading of all deliveries, as well as methods of distribution, before the public could be expected completely to be won over.

Are housing authorities fully aware of the need for providing adequate storage capacity for solid fuel, and how can we bring this question to their notice? Members were unanimously of the opinion that housing authorities do not allow adequate storage accommodation for solid fuels, particularly coke. It was considered that distribution difficulties, which might be expected to increase in the future, made it essential for this problem to receive much more attention.

Newton Chambers Housing Site

BUILDING is about to begin on a housing estate for employees of Newton Chambers & Co., Ltd. According to *Thorncliffe News*, the Company's house magazine, the estate at Mount Pleasant, Chapeltown, has been planned to give the effect of small groups of houses round an open green space. Present plans are for three pairs of semi-detached three-bedroom type; two pairs of semi-detached two-bedroom type; and six bungalows, two of which may be detached, each with one bedroom.

The site is a pleasant one, conveniently situated near the main road. Special attention has been paid to landscape planning, and the entrance will be through a strip of well laid-out garden which will border the road.

The architects, T. H. Mawson and Son, of Lancaster, have collaborated with Thorncliffe designers to incorporate the Newton Chambers heating appliances and thus to ensure warmth. Hot water for the kitchen, and for radiators in the hall and bedrooms, will be supplied from a Bacboiler in the dining room. Sitting rooms and dining rooms will be fitted with Newton Chambers all-tiled fireplaces, and Redfyres will be installed in the sitting rooms.

The houses will be of traditional construction, built by J. F. Finnegan & Co., Ltd. Walls will be of brick, with tiled roofs and timber and concrete floors. Roofs and doors will be insulated against draught. To achieve a pleasing and colourful effect, the outside walls of the houses will be treated with plastic emulsion in attractive shades. A great deal of thought has been given to labour-saving and convenience for the housewife. All the houses will have gas-boilers, and the tenant will have a choice between gas and electric cookers. Plenty of cupboard and storage space has been allowed for.

CANNON NEW YEAR DANCE

A FEATURE of the new year dance held at the Civic Hall, Wolverhampton on January 1 of Cannon (G. A.), Ltd., was a London cabaret which has performed at the Dorchester, Savoy, Grosvenor House, Mayfair, and Park Lane, and other famous London hotels. Another novelty was an itinerant ice cream vendor who gave his wares away to the guests throughout the evening.

The surprise of the evening, however, was announced by Mr. A. F. Oatley, Chairman and Managing Director, who gave away a Cannon A125 cooker as the prize for a special elimination dance for married employees who had been with the firm two years or more. In his remarks, the Chairman said that they could all celebrate the success of the Cannon A125—the most epoch-making cooker yet introduced. 'But whatever progress we make, either as individuals or as a company, I hope we shall never reach the state when it is not Tom, Dick, or Harry.'

Only married employees who had been with the company for at least two years were eligible for the prize A125 cooker. The winner, shown here (centre) with Mr.. and Mrs. A. F. Oatley, was Mr. Sam Lowe, a worker in the enamel shop who had been with the company for 45 years.

BELFAST GAS PROFITS

A REVIEW of the Belfast Corporation Gas Department states that for the year ended March 31, 1953, the Department made a gross profit of £148,981, and a net profit of £5,359. Although the quantity of gas made was slightly less than in the previous year, the cost of production and supply rose by £203,094, bringing total expenditure on the revenue account up to £2,184,224.

The demand for gas was very irregular, but during the exceptionally cold spell consumption soared beyond all previous records, and the highest output for a single day was 21.499 mill. cu.ft. The year ended with a total output of 5,750.2 mill. cu.ft., a comparative reduction of 24.1 mill.

The quantity of coal carbonised was 247,600 tons, the highest annual consumption to date, and 4,343 tons more than in 1951-52. The yield of gas worked out at 17,972 cu.ft. per ton. For the manufacture of carburetted water gas the Department used 2,304,372 gal. of gas oil. There was a heavy demand for coke, and sales amounted to 77,359 tons representing a revenue—including works consumption—of £400,023.

The chemical section distilled 19,300 tons of crude tar and over 13½ mill. gal. of ammonia liquor. It produced and sold 2,724,000 gal. of road tar, 698,000 gal. of creosote oil, 1,368 tons of sulphate of ammonia, and 519,000 lb. of liquid ammonia. Altogether the chemical section contributed over £155,000 to the Department's revenue.

The stove section supplied and fitted 8,700 cookers and 2,200 other appliances, and the cookery demonstrators gave practical demonstrations in the homes of all classes of consumers. The popularity of demonstrations at headquarters increased to such an extent that at times it was necessary to restrict admission.

The extension of supplies to new housing estates involved the laying of 17 miles of mains during the year. A further development was the bringing into service of two major units of gas making plant—a new carburetted water gas plant with a capacity of 3 mill. cu.ft. per day, and the first half of a bench of vertical retorts after its reconstruction. Work was started on the second section of the bench.

Two new steam driven exhausters each with a capacity of 250,000 cu.ft. per hour were installed, and a beginning was made on the construction of a new administrative building for the chemical section.

A net increase of £85,000 in production costs made it necessary for the Corporation to raise the charge for gas by 4½d. per 1,000 cu.ft., estimated to represent on the average an additional 2½d. per week per consumer.

Gas Council Films

SINCE the Building Centre re-opened in more spacious premises in Store Street, London, two years ago, about 150,000 visitors have inspected the latest developments and techniques of the building and allied trades and industries represented in the varied display. About 80,000 of the visitors came in the last 12 months.

Among the latest attractions is the film show in the lounge of the Gas Section, where visitors can view in the warmth provided by an open coke fire. The Gas Council has installed an Ampro Daylight Film Projector, with a repeater projector which can be brought into operation at the turn of a switch. The projector is a self-contained unit showing the film through the front of the appliance—similar to a TV receiver.

One of the films now being shown is 'Pride and Joy,' in which Philip Harben demonstrates a variety of gas cookers, and a number of Gas Council films now in course of production will be shown shortly. The Gas Council is also providing a programme of information films for some of the lunch-time shows given in the Building Centre's lecture theatre to audiences of architects, builders and architectural students.

Darlington Theatre Re-Opened

A SPECIALLY invited audience, composed mainly of leaders of the various women's organisations in the town, saw the Mayor of Darlington, Councillor C. Anderson, with the Mayoress, officially re-open the Northern Gas Board demonstration theatre at the gas showrooms, Darlington, on December 18.

Mr. F. Wilson, Divisional General Manager, introduced the Mayor, who is also Chairman of the Darlington Divisional Consumers' Committee, and was a member of the Darlington Gas Committee before nationalisation. The Mayor received a vote of thanks for conducting the ceremony.

BIMCAM *British Industrial Measuring & Control Apparatus Manufacturers*

'GET off your knees to the Americans' was the advice given to British industry by Mr. Douglas Wilson, petroleum equipment expert, at the annual luncheon in London on January 12 of the British Industrial Measuring and Control Apparatus Manufacturers' Association. Over recent years, said Mr. Wilson, who is President of the European Federation of Petroleum Equipment Manufacturers, the development in industrial instruments had been very nearly miraculous. 'Instruments in oil refineries almost think aloud. Your field is absolutely illimitable. But you must become aggressive. The intuitive genius of the Englishman is equal to that of anyone in the world.' Mr. Wilson referred to the great benefits that instrumentation could bring to every phase of national life. 'American research is plodding,' he observed. 'Use the native genius of the Englishman, who can always leap one ahead and see the answer.'

Representatives of the British industrial instrument industry and their guests at the luncheon also heard speeches from Col. Sir Harold Smith, Chairman of the Gas Council, Mr. H. W. Blake, President of the Association, and Mr. W. G. Thomas, their Chairman.

Mr. Thomas claimed that British equipment could compete at every point with that of the Americans and Germans, and that British equipment always lived up to the promises made about it. The exports of the instrument industry as a whole had increased by 30%, and they looked with confidence to the support of the Government departments concerned.

Special attention had been paid to publicity in the past year; the BIMCAM Handbook had been well received and articles had been published; and the 2nd British Instrument Industries Exhibition had been put on at Olympia in July, 1953. All this had helped in raising the prestige of the Association.

Colonel Sir Harold Smith, Chairman of the Gas Council (right), at the B.I.M.C.A.M. luncheon, with W. G. Thomas and W. G. Ardley (left), Chairman and Founder respectively of the Association.

News in Brief

Falk, Stadelmann & Co., Ltd., announce that their range of 'Warmglow' gas bowl fires will be supplied in future only under their registered trade mark 'Veriglow.'

The Six Hundred '25' Club held its second annual dinner in London in December. The club was formed last year when a silver badge was presented to all who had served for 25 or more years with George Cohen Sons & Co., Ltd., or any of the other associated companies in the '600' Group. The 332 members represent, between them, 9,405 years of work. Among those present was Mr. Cyril M. Cohen, Chairman of the parent company and a founder member of the club.

Consett Urban Council has accepted terms by the Northern Gas Board for supplying gas to houses on the Ebchester Estate. The Board originally intimated that it would only supply gas to houses which has gas cooking facilities, but following discussions with the Council the Board offered to reconsider this decision if the Council paid £5 for each of the houses involved. This is 35s. per house more than the usual contribution demanded by the Gas Board for supplying gas to houses.

Gas Meter Experiment.—Greenock Town Council is to co-operate with the Scottish Gas Board in an experiment to try to reduce the number of thefts from pre-payment gas meters in the town. One hundred stronger padlocks are to be fitted on meters in houses in an area to be selected by the chief constable in consultation with officials of the Board, and occupiers of houses where meters had been broken into are to be given the opportunity of having stronger padlocks fitted.

A Complete Miniature House, serviced by every modern gas appliance, attracted the attention of thousands of Christmas shoppers passing the Northern Gas Board's Sunderland showrooms, where it has occupied the main window display. Six feet high and 20 ft. in length, the snow-covered house is perfect in every detail—down to tablets of soap in the washbasins. The display was prepared for the showrooms by Mr. James Watson, advertising and publicity officer for the Sunderland Division. It took Mr. Watson almost a month to make the model in his office in the Hind's Bridge depôt of the Division. Most of the furniture and fittings he carved in wood himself. There were several inquiries as to whether the house could be bought as a child's Christmas present.

The City and Guilds of London Institute's Insignia Award in Technology—instituted 12 months ago—is intended to provide a high qualification for persons in industry whose initial training was that of practical experience combined with study. Such persons, who possess appropriate City and Guilds' certificates as craftsmen or technicians, and having advanced still further in their industry may, subject to certain conditions, enter for the award. Under the Institute's Royal Charter, successful candidates will be entitled to use the insignia letters 'C.G.I.A.' Further details may be obtained from: The Director, Department of Technology (I.A.), City and Guilds of London Institute, 31, Brechin Place, London, S.W.7.

Since our Acknowledgment in the JOURNAL of January 6 of calendars and diaries which had reached us up to that time we have received a monthly tear-off calendar from the Wellman Smith Owen Engineering Corporation, Ltd. Each sheet bears a beautiful coloured print of a different Wellman industrial installation.

Coleraine Borough Council has granted the Gas Manager (Mr. W. R. Armstrong) a bonus of £350 in respect of his services on the capital reconstruction works of the Council's gas undertaking. The Town Clerk told the Council that Mr. Armstrong had supervised over the past seven years work costing more than £80,000, and had saved the Department thousands of pounds.

Papers will be Presented at a conference to be held by the British Occupational Hygiene Society at the London School of Hygiene and Tropical Medicine on April 6 on the problems arising in industry from the use of materials which present a danger to the health of the workers. Further details and application forms may be obtained from Mr. P. C. G. Isaac, Public Health Engineering Laboratory, King's College, Newcastle-upon-Tyne, 1.

Strabane (Co. Tyrone) Urban Council has decided to apply for a loan of £7,000 for the gas undertaking. The Gas Manager, Mr. J. Lusted, told the Council that in view of the number of new houses to be erected it would be necessary to provide supply services and an additional bed of retorts. Mr. Lusted also stated that the demand for gas was the highest on Christmas Eve and Christmas Day for ten years, being equal to 20,000 cu.ft. per hour during the dinner period.

Newtownards Borough Council has adopted the Gas Manager's recommendation to hold an exhibition of gas appliances in May. Subject to a report from the Consulting Engineer the Council approved the acceptance of a tender for the erection of purifier foundations and an oxide shed. Newry Urban Council Gas Committee has also decided to take a stand at the forthcoming trade and industrial exhibition to be held under the auspices of the Junior Chamber of Commerce.

One Hundred university scholarships in mining engineering and allied subjects are offered by the National Coal Board to boys from school who have reached a high standard in the General Certificate of Education or Scottish Leaving Certificate; young men already in the industry who have university entrance qualifications, and certain graduates who wish to extend their qualifications for posts of high technical responsibility in mining. Application forms, which must be returned by April 30, are obtainable from the Board's Education Branch at Hobart House, London, S.W.1.

Stourport District Council decided after a long and stormy debate on January 7, a by margin of one vote, to rescind a previous decision that gas should not be supplied to 72 houses to be built on the council's new estate at Walshes Farm. Mr. H. E. Rose, introducing the motion, said all the tenants should have the benefit of choice of gas or electricity. Gas appliances were cheaper, and a census among tenants showed they were more popular. Some of those moving into the new houses would have their own gas cookers of which otherwise they would have to dispose.

Dealer Co-operation in Scotland

AN ARRANGEMENT to further sales co-operation between the Scottish Gas Board and ironmongers, and lead to improved distribution of gas appliances, has been reached between the Board and Scottish members of the National Federation of Ironmongers. It was explained to a meeting of Edinburgh hardware traders by Mr. T. Smith, Sales Manager of the Board's Edinburgh Division.

The scheme calls for the provision by ironmongers of approved showroom display facilities for gas appliances. Where a cash or hire purchase sale is effected or results from an introduction by a member of the Federation who is giving such display facilities, a commission will be allowed to the ironmonger of 12½% of the standard cash selling price of the appliance (exclusive of purchase tax and any amount which may be included by the Board to cover installation). An ironmonger not providing display facilities may purchase appliances outright from the Board for resale to customers; he will receive a discount of 10%.

Mr. Smith pointed out that the discount allowed was net and did not involve the ironmonger in any responsibility either in respect of the condition of the goods delivered or performance of the appliance installed. While 10% was not as high a percentage as was normally taken in the case of other articles an ironmonger might trade in, it should be remembered that he was not saddled with these particular responsibilities, in which case the 10% was equivalent to a higher rate.

The Board is distributing between 400 and 500 gas cookers per week. The gas industry, Mr. Smith pointed out, had been an expanding industry for many, many years, and there was every reason to believe that, with modern domestic appliances of a quality kind and selling at highly competitive prices, it would go on expanding.

Mr. Smith said the Board would undertake to call every morning on ironmongers who were giving approved displays and inquire what interest there had been on the previous day. 'We will follow up every inquiry as quickly as possible and as often as possible the same day. If the ironmonger who has no display but has an interested customer will get in touch with us, we will follow up the prospect as quickly as possible. In all cases it is a matter of leting us know; we will do the rest.'

Mr. T. Scott Kelly, of the Edinburgh, Leith, and District Ironmongers' Association, said that the scheme offered many advantages to ironmongers and deserved their support.

COMPANY NEWS

MIDLAND TAR DISTILLERS

Midland Tar Distillers, Ltd., propose a dividend of 8% for the year to June 30, 1953, as for the previous 12 months, but on an ordinary capital increased from £675,000 to £1¼ mill. by issue last January. The group net profit of £116,821 compares with £130,967, after tax of £166,987 (£174,895), depreciation of £125,927 (£119,289) and provision for contingent liability of nil (£5,000), etc. To finance expansion of productive capacity to give the group better command of raw material sources, large issues of debenture and equity capital were made in January last.

PARNALL (YATE)

The whole of the share capital of Ewart & Son, Ltd., has now been sold to Parnall (Yate), Ltd. Last October it was announced that negotiations for this deal were in progress. Further details of the transaction are expected to be announced shortly. The purchase will not mean Parnall's breaking into a new field as it already directly controls Ascot Gas Water Heaters. Ewart & Son, Ltd., was controlled by Imperial Continental Gas Association, which held all the 200,000 preference shares on which no dividend had been paid. The 180,000 ordinary shares of Ewart & Son were held by Ewart Holdings. The Holding company retains the business of Ewart Catering Equipment & Hildred Bros.

POWER GAS CORPORATION

Group trading profits of the Power-Gas Corporation, Ltd., for the year ended September 30, 1953, amounted to £758,694, compared with £720,870 for the previous year. Net profit attributable to the parent company was £167,972 against £192,521. Total dividend for the year is 12% against 14% for the previous year on a smaller capital. Orders booked totalled £6¼ mill., or slightly less than the previous year's peak figure. At the same time the value of orders received from the iron and steel industry was the highest in the company's history. Orders on hand will keep the undertaking busy for some time to come, 'and we are hopeful,' says the annual report, 'that the improved flow of raw materials and bought-out components which we are now experiencing, coupled with the increased capacity of our new works and contracting organisation, will enable us to offer quicker deliveries than hitherto.'

CANNON (HOLDINGS) LTD.

In his statement to the general meeting of Cannon (Holdings), Ltd., at Bilston, Staffs., on December 21, the Chairman and Managing Director, Mr. A. F. Oatley, said that since the end of the last financial year, two further wholly owned subsidiary companies had been formed (Cannon (GA), Ltd.—Gas Appliance Sales and Service, and Cannon (CP), Ltd.—Chemical Plant Sales and Service) to take over matters of trade leaving the parent company general direction of the group's activities. The results of the current year to date proved the continuity of a recovery experienced in the second half of the financial year. This recovery was in great measure due to the success of the new Cannon A.125 gas cooker, which incorporates the fold-away eye-level grill. This cooker pioneered by the company had, since its introduction in January, 1953, enjoyed an enormous success throughout the country. As 'Britain's Best Cooker' it struck an entirely new and bold note in cooker design, function and utility, and further enhanced the company's already high reputation for quality. The reception and success with the housewife stamped it as an epoch-making product, and justified the confident predictions he had made previously. The company had been able to obtain patents for various of its outstanding features both at home and abroad. In spite of the necessity to reduce the output of other cookers to get the A.125 into large-scale production, the liquid position of the company's assets remained excellent. The directors therefore were justified in maintaining the final distribution at the same figure as the previous year, especially as results for the current year are so promising. A final dividend of 15%, less tax, making 25%, less tax, for the year, was approved.

Two Building Exhibitions

Two building exhibitions organised by local educational authorities in co-operation with the Ministry of Works will be held at technical colleges in London and Norwich during February. The public will be able to visit workshops of the college where the exhibitions are staged. The Minister of Works Sir David Eccles, will open the first, at Willesden Technical College, on February 1. The exhibition will remain open until February 6. The exhibition at Norwich will be opened by the Lord Mayor of Norwich, Mr. J. H. Mottram, on February 16.

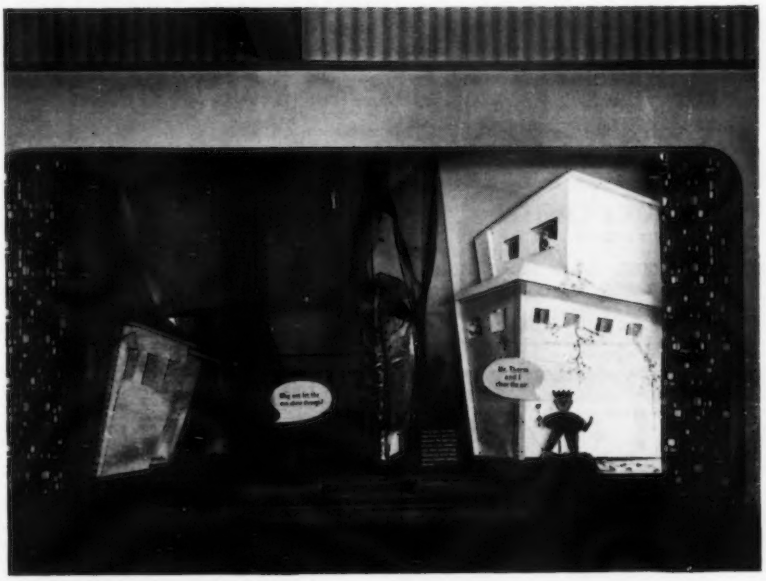
'Building Today' will be the theme of Willesden's exhibition, where besides the Ministry's exhibits, visitors will see displays by building development associations and the local council, demonstrations of portable powered tools, and the work of students. The aluminium, zinc, lead and rubber development associations' displays will be concerned with the use of their respective products.

Equipment used in connection with coal, gas, and electricity will be on view, and demonstrations of portable powered tools will include those used in carpentry and joinery, plumbing, metal work, painting, and decorating.

The Ministry's exhibits at the Norwich City College will be 'Domestic Plumbing,' which contrasts good and poor practice in domestic hot and cold water installations, and the 'Building Research and Housing' exhibit. The building workshops of the College will be open to visitors. Displays of students' work and demonstrations of portable powered tools will be staged on the premises.

The Ministry's displays at the Norwich School of Art will include constructional work for the Coronation and wall charts on such subjects as thermal insulation, pattern staining on ceilings, and the painting of new plaster and cement.

LEEDS SMOG DISPLAY



A smog display designed by the Publicity Section of the North Eastern Gas Board photographed in the head office entrance vestibule. The display is to be made up in suitable form for circulating round the main showrooms. The photograph does not do full justice owing to the fact that the display was partly dependent upon special lighting. There was also a rotating vane behind the left hand building which threw a moving shadow across the background, thus heightening the effect.

Jolias
GRAPHITE PRODUCTS LTD.
LONDON, S.W.11.

CASES FOR BINDING
Quarterly Volumes of the "Gas Journal."
5/- each, post free
Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

J. BROWN & CO. LTD.
SAVILE TOWN, DEWSBURY, YORKS.
Supply:-
"BROWNOX-de-LUXE" PURIFYING MATERIAL
Purchase:-
SPENT OXIDE

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

OXIDE
DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON
Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.
Send your enquiries to
GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.
Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

BUFFALO EJECTOR

For pumping water or other liquids.
Send for List:-
GREEN & BOULDING, LTD.
162a Dalston Lane, London, E.8

PRESSURE VESSELS
FOR THE GAS AND CHEMICAL INDUSTRIES
Welding in all Metals (Gas or Electric)
Welding Repairs
RICHMOND WELDING CO.
Richmond Road, BRADFORD
Tel.: BRADFORD 25405

FIRE!
ANYTHING SO FAST AS
NU-SWIFT?
Large fires generally start as small ones. Speed is vital. Fire engines sometimes carry Nu-Swift but why waste precious minutes! Rapid and reliable Nu-Swift should be on the spot—always!
NU-SWIFT LTD · ELLAND · YORKS
In Every Ship of the Royal Navy

"KLEENOFF" *
THE COOKER CLEANER
"KLEENOFF"
FIBRE BRUSHES
RUBBER MOPS
"KAY-DEE" *
KETTLE DESCALER
For resale to the public, and in bulk for Works use.
BALE & CHURCH, LTD.
7, CROMPTON WAY, CRAWLEY, SUSSEX.

The
LIMIT OF EFFICIENCY CAN BE REACHED
by the use of
LUX
GAS PURIFYING MATERIAL
Sole Importers:
HARRISONS (London) LIMITED
66, Mark Lane, LONDON, E.C.3
Telegrams: Birchrock, London Telephone: ROYal 3128

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is accepted from the provisions of the Notification of Vacancies Order 1952.

DRAUGHTSMEN required, experienced in Steel plate and Structural work. Salary according to capabilities. Five-day week.
Apply: Samuel Cutler & Sons, Ltd., Millwall, London, E.14.

MIDDLESEX COUNTY COUNCIL

COUNTY ARCHITECT'S DEPT.

HEATING ENGINEERING ASSISTANT required, A.P.T. II (£495-£540 per annum plus London Weighting). Appointment at grade minimum. Established pensionable, subject to medical assessment and prescribed conditions. Should be able to design small heating and hot water service schemes working under supervision. Application forms (stmpd add. env. f'scap) from County Architect, 1, Queen Anne's Gate Buildings, Dartmouth Street, S.W.1, returnable by February 2 (quote M.956 G.J.). Canvassing disqualifies.

WALES GAS BOARD

CARDIFF UNDERTAKING
APPOINTMENT OF
INDUSTRIAL GAS ENGINEER

APPLICATIONS are invited for the above- mentioned position.

Candidates must be competent to deal with all enquiries for gas for industrial, large scale commercial and central heating purposes, including the preparation of schemes for installations and necessary estimates.

The salary offered is within the scale A.P.T.(A) VII (£545-£625 per annum) of the National Joint Industrial Council for Gas Staffs.

The successful candidate will have to undergo a medical examination, and will be required to contribute to the Board's Superannuation Fund.

Applications setting forth particulars of experience, qualifications and personal details, giving the names of two referees should reach the Undersigned not later than fourteen days after the date of this advertisement.

J. POWDRILL,
General Manager & Engineer.

Gas Offices,
Bute Terrace,
Cardiff.

WALES GAS BOARD

ENGINEER AND MANAGER—
ABERCARN UNDERTAKING

APPLICATIONS are invited for the position of ENGINEER AND MANAGER of the above Undertaking.

The Undertaking is in receipt of supplies of gas in bulk and candidates for the appointment must have had administrative and sales development experience and possess suitable technical qualifications, particularly in respect of gas distribution.

The commencing salary will be within A.P.T. Grade XIIa (£740/865 per annum) in accordance with qualifications and experience.

The successful candidate will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and names of two referees, should be received by the undersigned not later than January 30, 1954.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

PRODUCTION ASSISTANT

APPLICATIONS are invited from suitably qualified persons having practical gasmaking experience for the post of Production Assistant on the Technical Headquarters Staff of the Wales Gas Board.

The duties will include the collation of gas making returns from individual Undertakings at Headquarters level as well as practical advisory work at Undertaking level throughout the whole of Wales. Sound practical knowledge of carbonising and water gas practice is essential. The work will necessitate residence in Cardiff and applicants will be expected to travel as may be required.

The appointment will be within Grade A.P.T. IX(A) (£615/715 per annum), and will be subject to a satisfactory medical examination and entry into the Board's Superannuation Scheme.

Applications stating age, training, qualifications and experience, together with details of present and previous appointments accompanied by the names of two referees, should reach the undersigned not later than January 30, 195 .

C. B. MAWER.
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

DEPUTY ENGINEER & MANAGER—
RHYL, PRESTATYN AND ST. ASAPH
UNDERTAKINGS

APPLICATIONS are invited for the position of DEPUTY ENGINEER AND MANAGER of the Rhyl, Prestatyn and St. Asaph Undertakings.

Candidates for the appointment must have had administrative experience and possess appropriate technical qualifications.

The commencing salary will be within the Grade A.P.T. XIa (£690/£815 per annum) according to qualifications and experience of the successful applicant.

The successful candidate will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and names of two referees, should be received by the undersigned not later than February 6, 1954.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

JERSEY GAS LIGHT CO., LTD.

ASSISTANT ENGINEER

APPLICATIONS are invited for the position of ASSISTANT ENGINEER to the above Company.

Candidates for the appointment must be Corporate Members of the Institution of Gas Engineers or of the Institutions of Civil or Mechanical Engineers and should have had practical experience with Woodall-Duckham Continuous Vertical Retorts and with both high and low pressure distribution systems.

The salary will be £1000 rising to £1200 per annum by four equal annual increments subject to satisfactory services. The successful candidate will be required to pass a medical examination.

Applications stating age, whether married or single, details of qualifications, Training and experience, and accompanied by *copies* of testimonials shouldbe addressed to: S.P. Pepin, Esq., O.B.E. B.Sc, M.Inst. Gas E. Managing Director, 97, Bath Street, St. Helier, Jersey, Channel Islands.

December 30, 1953.

EAST MIDLANDS GAS BOARD

SALES AND SERVICE OFFICER
GRIMSBY GROUP

APPLICATIONS are invited from suitably qualified persons for the above post. Applicants should have sound experience in the administration of a sales and consumer service department, and a suitable technical qualification will be an advantage. The successful candidate will be responsible to the Group Manager for the development of sales and consumer service and control of all fitting work. The appointment will be made in grades A.P.T. XI/XII (£690/865).

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, marital state, qualifications and giving full details of experience and positions held also the names of two referees, should be sent to the undersigned to arrive not later than January 31, 1954.

B. CLARKE,
Divisional General Manager.

East Midlands Gas Board,
Belle Vue House,
Carline Road,
Lincoln.

January 12, 1954.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
SHIFT SUPERINTENDENT—
LEICESTER UNDERTAKING

APPLICATIONS are invited for the position of SHIFT SUPERINTENDENT at the Aylestone Road Works. Grade A.P.T. VIII salary range £585/£665 per annum.

Candidates should have obtained the Higher Grade Certificate of the Institution of Gas Engineers, or its equivalent, and should be capable of controlling the day-to-day operation of the Works, which has a capacity of 12 million cu. ft. of coal gas and 7 million cu. ft. of C.W. Gas per day. Candidates should be conversant with the control of Glover-West C.V. Retorts and fully automatic Humphreys & Glasgow C.W.G. Plant, and the usual ancillaries.

The successful candidate may be required to pass a medical examination and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications, present position and experience, together with the names of two referees, should be addressed to the undersigned to be received not later than Wednesday, January 27, 1954.

H. B. TAYLOR,
Millstone Lane, Divisional General Manager.
Leicester
January 5, 1954.

HOUSE AVAILABLE for FIRST CLASS GAS- FITTER—Vacancy occurs for first class gasfitter at the Melton Mowbray Undertaking. Provincial 'A' rates of pay applicable, and a house is available on reasonable terms under Service Occupation Agreement. Applications stating age, qualifications and experience to be received by the undersigned not later than Wednesday, January 27, 1954.

H. B. TAYLOR,
Divisional General Manager.

East Midlands Gas Board,
Leicester & Northants Division,
Millstone Lane,
Leicester.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS. DIVISION
APPOINTMENT OF ASSISTANT
DIVISIONAL GENERAL MANAGER

APPLICATIONS are invited for the appointment of ASSISTANT DIVISIONAL GENERAL MANAGER in the Leicester and Northants. Division of the Board. The commencing salary will be governed by the experience and qualifications of the successful applicant but will be not less than £1,700 per annum.

Candidates must have wide administrative and executive experience in a large-scale organisation and will be expected to possess proven managerial ability. Qualifications held need not necessarily be of a technical nature. There will be scope for the person appointed to be promoted to Deputy Divisional General Manager.

The successful candidate will be required to pass a medical examination, and, unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications giving full details of age, education, qualifications and experience, together with the names of two referees, should be sent to the undersigned to be received not later than February 6, 1954.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.

January 13, 1954.

SOUTHERN GAS BOARD

EASTERN DIVISION
SOUTHAMPTON AND DISTRICT
GAS UNDERTAKING
ASSISTANT GROUP ACCOUNTANT

APPLICATIONS are invited from qualified persons for the above appointment for which the commencing salary offered will lie between £750 and £1,000 per annum according to knowledge and experience.

Administrative experience and ability to control staff are essential. Knowledge of Cost Accounting and Budgetary Control would be an advantage.

The successful applicant will be expected to reside in the Southampton District and a house will be made available for him at a rent fixed in accordance with the Southern Gas Board's normal scale.

The person appointed will be required to undergo a medical examination and will also be expected to join the Southern Gas Board Staff Pension Scheme.

Applications giving full particulars of age, education, qualifications, training and experience should be submitted to the undersigned at The Square, Portsmouth, not later than February 8, 1954.

W. K. TATE,
Divisional General Manager.

January 13, 1954.

SCOTTISH GAS BOARD

KILMARNOCK GROUP
NEWTON-ON-AYR AND AYR DISTRICT
DEPUTY DISTRICT MANAGER

APPLICATIONS are invited from Corporate Members of the Institution of Gas Engineers for the post of DEPUTY DISTRICT MANAGER for the Newton-on-Ayr and Ayr Undertakings.

Applicants should have experience in the maintenance and layout of Gas Works Plant and Distribution Systems, and a knowledge of general office routine.

The duties of the successful applicant will be mainly concerned with the day to day running of the Ayr undertaking.

The salary applicable to the post will be Grade IX (Provincial 'A') of the National Salary Scale, £615 per annum rising to £715 by annual increments of £20 with placing according to experience and qualifications. A house will be available at a reasonable rent.

Applicants should state whether they are presently in a superannuated position, and the successful applicant may be required to pass a medical examination before the appointment is confirmed.

Applications giving full particulars of age, qualifications, experience and present position, and the names of two referees, should be lodged with the undersigned not later than January 30, 1954.

C. E. N. FRESHNEY,
District Manager.

Newton-on-Ayr Gas Works,
Ayr
January 9, 1954.

(*Classified Advertisements continued on page 174*)

APPOINTMENTS VACANT (ctd.)

THE POWER-GAS CORPORATION LTD., Stockton-on-Tees has vacancies for GAS/CHEMICAL ENGINEERS. Work will be mainly in connection with the basic design of Gas and Chemicals Plant. Permanent position, good prospects. Apply stating age qualifications, etc. to Staff Personnel Officer,

MORLEY PRODUCTS (PADIHAM) LTD.
SALES REPRESENTATIVES

APPLICATIONS are invited from suitably qualified persons for positions in the North and Midlands, also London and the South of England. The successful applicants will be required to live on the territory, and full details of training, experience, etc., should be given, also age and salary required. Contributory pension scheme is available and car provided. Applications should be addressed to: The Managing Director, Victoria Works, Padiham, Lancs., and the envelope endorsed 'Representative'.

GAS COUNCIL—MALE CLERICAL ASSISTANT required for the Industrial Relations Department of the Gas Council. Duties will include work in connection with the correlation of information on salaries, wages and working conditions. Matriculation standard is desirable, and applicants must have completed National Service. The post, which is pensionable, will be in Grade C of the National Salary Scales, the range for which grade is £475 to £545 a year.

Applications, stating age, present position, qualifications and experience, should be addressed to the Secretary, The Gas Council, 1, Grosvenor Place London, S.W.1, to reach him within fifteen days of the appearance of this advertisement.

NORTH THAMES GAS BOARD

THE following DRAWING OFFICE staff is required by the Board:

CHIEF ENGINEER'S DEPARTMENT, WESTMINSTER, S.W.1.

(i) SENIOR DRAUGHTSMEN experienced in:
(*a*) the preparation of schemes and contract specifications of small capacity generating plant, high tension and low tension switchgear, together with cable and electric lighting installations as applicable to gasworks. Candidates should possess the minimum qualification of A.M.I.E.E. Starting salary within the range £720-£895 per annum.
(*b*) the design of materials handling plant, together with the detailing of the necessary steel structures. Starting salary within the range £645-£845 per annum.

(ii) DRAUGHTSMEN experienced in:
(*a*) the detailing of reinforced concrete structures and general civil engineering work, and
(*b*) the detailing of steel structures and layout of gas plant and pipework.
Starting salaries within the range £490-£695 per annum.

CHEMICAL PRODUCTS WORKS, BECKTON, E.6

(i) SENIOR DRAUGHTSMAN to take charge of the PRODUCTS WORKS DRAWING OFFICE, which deals with maintenance and development schemes. The successful candidate will be responsible to the Mechanical Engineer. A.M.I. Mech.E. qualification would be an advantage. Starting salary within the range £720-£895 per annum.

(ii) DRAUGHTSMAN experienced in high tension and low tension switchgear, and accustomed to the layout of power and lighting circuits. Candidates should possess the minimum qualification of H.N.C. (Electrical Engineering). Starting salary within the range £675-£750 per annum.

Starting salaries will be paid according to age, qualifications and experience, and the successful candidates will be required to join the Staff Pension Scheme.

Applications, giving age and full particulars, must state which position is being applied for, and should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference 666/140.

THE BRITISH TABULATING MACHINE CO., LTD. (HOLLERITH Punched Cards) has vacancies for EXECUTIVES possessing wide practical experience of accounting (including cost accounting) systems and practices used in public utility organisations. Successful candidates will be given a comprehensive training in the application of HOLLERITH equipment. The commencing salary will be in accordance with qualifications and experience. Applications, which will be treated as being strictly confidential, should be addressed to Sales Personnel Controller, The British Tabulating Machine Company Limited, 17, Park Lane, London, W.1.

LURGAN BOROUGH GAS DEPARTMENT
NORTHERN IRELAND

VACANCIES EXIST for the positions of WORKS FOREMAN and JUNIOR TECHNICAL ASSISTANT CHEMIST but with excellent opportunities for improved status.

Applicants should have in particular adaptability and a practical bent. A mechanical training whether obtained in Works scale operations or through the medium of home hobbies would be an advantage.

A contributory pension scheme is in operation.

Applicants should write to the undersigned giving at this stage details of past and in particular present responsibilities, remuneration received etc.

J. W. YOUNG,
Lurgan Gas Department, Engineer and Manager.
Co. Armagh.

NATIONAL COAL BOARD invite applications from SCIENTISTS AND ENGINEERS for an appointment in their Central Research Establishment at Stoke Orchard, near Cheltenham, to investigate new methods of carbonisation. Candidates should have good honours degree (or equivalent) in Chemistry, Chemical Engineering, Fuel Technology or related subjects, and preferably have had some experience in the design and operation of large scale experimental plant. The appointment is superannuable and will be in the grade of either Scientist III (£445 × £25 to £845) or Scientist II (£645 × £30 to £1,095), according to qualifications and experience.

Write, giving full particulars (in chronological order of age, education, qualifications and experience (with dates) to National Coal Board, Central Research Establishment, Stoke Orchard, near Cheltenham, Glos., marking envelope TT/728. Original Testimonials should *not* be forwarded. Closing date February 22, 1954.

WEST MIDLANDS GAS BOARD
ASSISTANT
DISTRIBUTION SUPERINTENDENTS
STOKE-ON-TRENT DISTRICT

APPLICATIONS are invited for the following posts:

(*a*) Assistant Distribution Superintendent, Longton District.

(*b*) Assistant Distribution Superintendent, Burslem/Tunstall District.

Candidates should have a sound knowledge and practical experience of mains and service laying, the installation of domestic and industrial gas supplies, experience in the working and maintenance of district governors and the control and supervision of workmen. The possession of an Ordinary or Higher Grade Certificate in Gas Engineering and Supply will be an advantage.

The salaries for these posts will be within Grade VI (£490-£570 per annum) of the National Salary Scales for Gas Staffs.

The posts are pensionable and the successful candidates may be required to pass a medical examination.

Applications, stating age, personal details, qualifications and experience, together with the names of two referees, should be addressed to Mr. J. E. Stanier, Divisional General Manager, Etruria Gas Works, Stoke-on-Trent, to reach him not later than fifteen days after the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

REPRESENTATIVE required by old-established firm of Engineers to call on Gas Boards in the Western half of England. Commission and expenses only. Car preferred. Write giving names of last two employers and brief details of experience. Apply: No. 180, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

TECHNICAL SALES REPRESENTATIVE required by manufacturers of well-known Automatic Controls. To cover Industrial Departments of the Gas Boards, Heating & Ventilating Engineers, and large production units. Partly London and partly Midlands and Northern Counties. Good opportunity for energetic and experienced man. Apply in own hand-writing, stating age, qualifications, and details of past experience. Apply: No. 178, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

EASTERN GAS BOARD
DISTRICT INSPECTOR

APPLICATIONS are invited for the position of DISTRICT INSPECTOR at the Maldon (Essex) Undertaking of the Board.

Applicants should be experienced in modern gas fitting practice and qualified to advise consumers, prepare estimates and direct the work of fitters.

The salary will be within Grade III, Prov. 'B' of the National Salary Scales for Gas Staffs, commencing at £445 per annum.

The successful applicant may be required to pass a medical examination.

Applications, stating age, qualifications, and experience, together with details of present and previous employment, should be addressed to Mr. F. N. Howes, Group Manager, Gas Works, Chelmsford, to reach him within fourteen days of the appearance of this advertisement.

PLANT FOR SALE

TWO Bryan Donkin Rateau Turbo BOOSTERS, each 460,000 cu. ft., 25/26 in. water gauge pressure difference, with driving motors 60-h.p., 400/3/50, 2,920 r.p.m., and control gear. Overhauled by makers, not used since.—George Cohen, Sons & Co., Ltd., 58, Wood Lane, London, W.12. *Tel.*: Shepherds Bush 2070.

PLANT WANTED

TURBO, or Rotary Blower or Compressor required. Capacity approximately 3,000 c.f.m. at 4/5 lbs. pressure per sq. in.

Offers to: No. 179, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

PATENTS

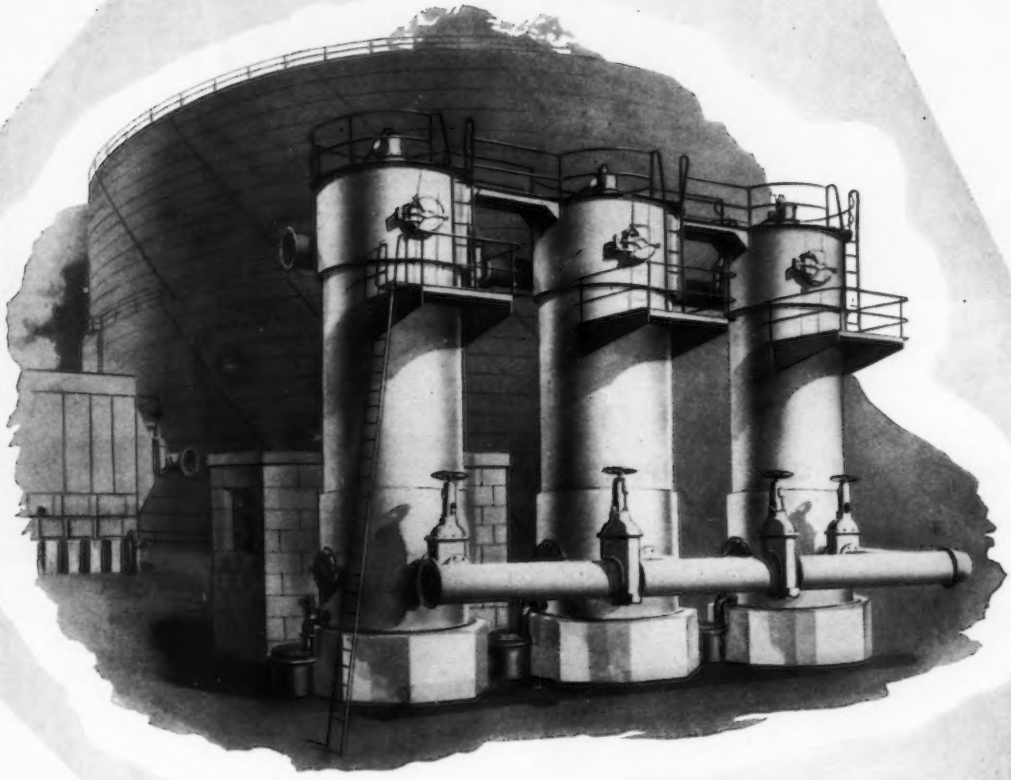
KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent.)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

WANTED

MERCURY
(QUICKSILVER)
Urgently wanted in any quantity; containers supplied; keenest prices. Cash on collection London Area. Also precious and non-ferrous scrap metals in all forms.
BELGRAVE BUYERS (G.J.)
5, Belgrave Gardens, LONDON, N.W.8. MAI. 7513

SCRAP GAS METERS WANTED!
A SPEEDY SERVICE
Sell to those best suited to deal with them.
TOP PRICES PAID
Collection arranged from anywhere in U.K. Truck Loads to our own private siding, Beddington Lane, Southern Region.
Sell to **MITCHAM SMELTERS LTD**
ROMETAL WORKS, RED HOUSE ROAD, MITCHAM ROAD, CROYDON SURREY
TELEPHONE THOrnton Heath 6101 PRIVATE BRANCH EXCHANGE

TAR EXTRACTION . .



. . more efficiently by

HOLMES ELEX

W. C. HOLMES & CO. LTD. HUDDERSFIELD
LONDON BIRMINGHAM

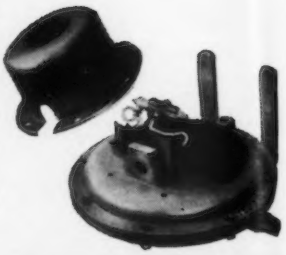
1658-2

controlling gas supplies

FOR CONTROLLING THE QUALITY OF AIR/GAS MIXTURE *irrespective of varying pressures and resistances. Temperature control is varied by manipulation of the air cock only.*
CAPACITY RANGE: *from 130 to 1,380 cub. ft. of gas per hour according to air pressure (¼ lb. to 1 lb.) and size. For low pressure gas systems.*
AIR INLETS: 1", 1¼", 1½" *and 2" dias. gas thread.*

THE SINGLE DIAPHRAGM AUTOMATIC SHUT-OFF VALVE *(illustrated left) automatically closes the gas supply in the event of pressure dropping below a predetermined point. Not until all burner cocks on the outlet have been shut and gas pressure restored is it possible to re-open the valve. This appliance is for operation on systems handling 150 to 2,400 cub. ft. of low pressure gas per hour.*

THE AUTOMATIC CUT-OFF SWITCH, *illustrated right, automatically breaks the electric supply to motor-driven gas boosters or compressors if low pressure gas falls below a predetermined pressure.*
RANGE: *Type 1 operates between .2" and 1.2" w.g. pressure.*
Type 2 operates between 1.2" and 5" w.g. pressure.
Type 3 operates between 5" and 15" w.g. pressure.
Additional applications include its use as (a) an air flow switch in conjunction with a flame failure device and (b) a gas meter protector.



INDUSTRIAL GAS EQUIPMENT

Keith Blackman LIMITED
MILL MEAD ROAD TOTTENHAM LONDON N.17
Phone: Tottenham 4522 (twelve lines) Grams: Keithlax, Norphone, London
BRANCH OFFICES AT MANCHESTER BIRMINGHAM LEEDS GLASGOW
NEWCASTLE-ON-TYNE PENARTH near CARDIFF AND BELFAST

521

Strength · Dependability
Accuracy · Durability

LEATHERS

FOR THE GAS INDUSTRY

DIAPHRAGM & GENERAL LEATHER CO. LTD.

FRANKLIN ROAD WORKS · PORTSLADE · SUSSEX

Telephone: HOVE 47266/7 Telegrams: DIAPHRAGM, PORTSLADE

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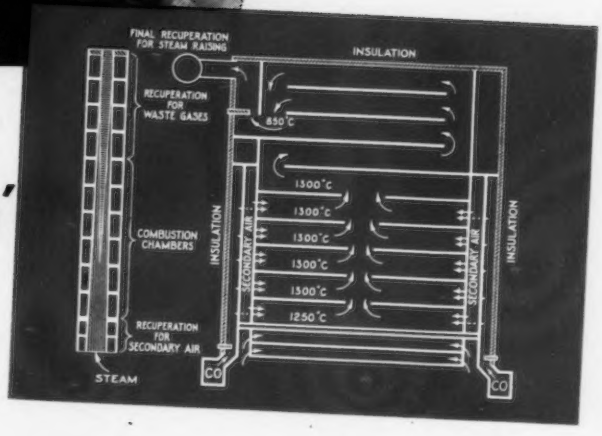

'BALANCED HEATING' saves fuel

"Balanced Heating", a feature of the Glover-West continuous vertical system of carbonization, reduces fuel consumption to a level hitherto unobtainable. In the "Balanced Heated" setting, producer gas enters the combustion chambers from *both* sides and retorts are evenly heated by *primary* combustion. Combustion proceeds towards the centre of the setting, heat transmitted to the outer walls being recovered in the producer gas and air uptakes and returned to the system. Control of temperature in individual combustion chambers gives greater flexibility—an important factor today when many different coals are handled by one plant.

★*Illustration shows a "Balanced Heated" setting under construction*

West's Gas IMPROVEMENT CO. LTD.

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